

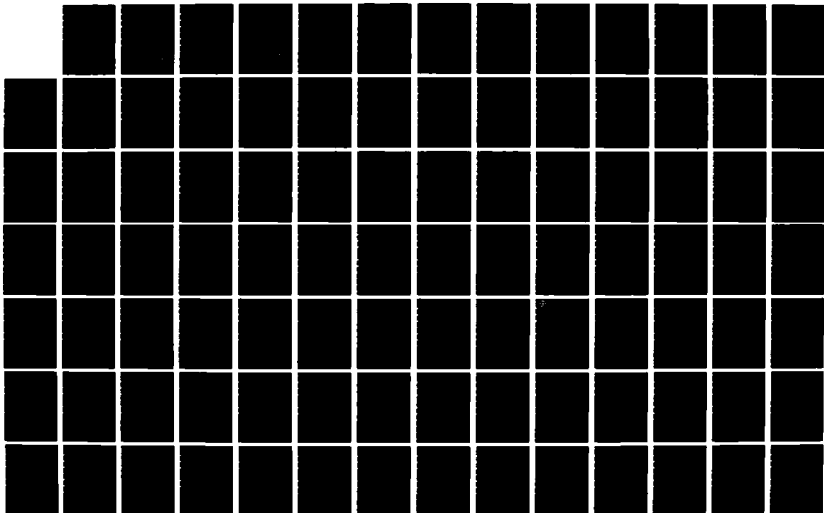
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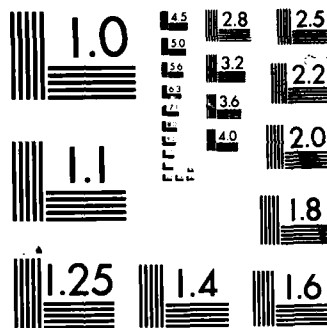
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FUELS BRANCH REORGANIZATION: A STUDY  
OF THE FUELS OFFICER AND THE  
FUELS ORGANIZATION

THESIS

Leon C. Spackman  
Captain, USAF

AFIT/GLM/LSM/85S-72

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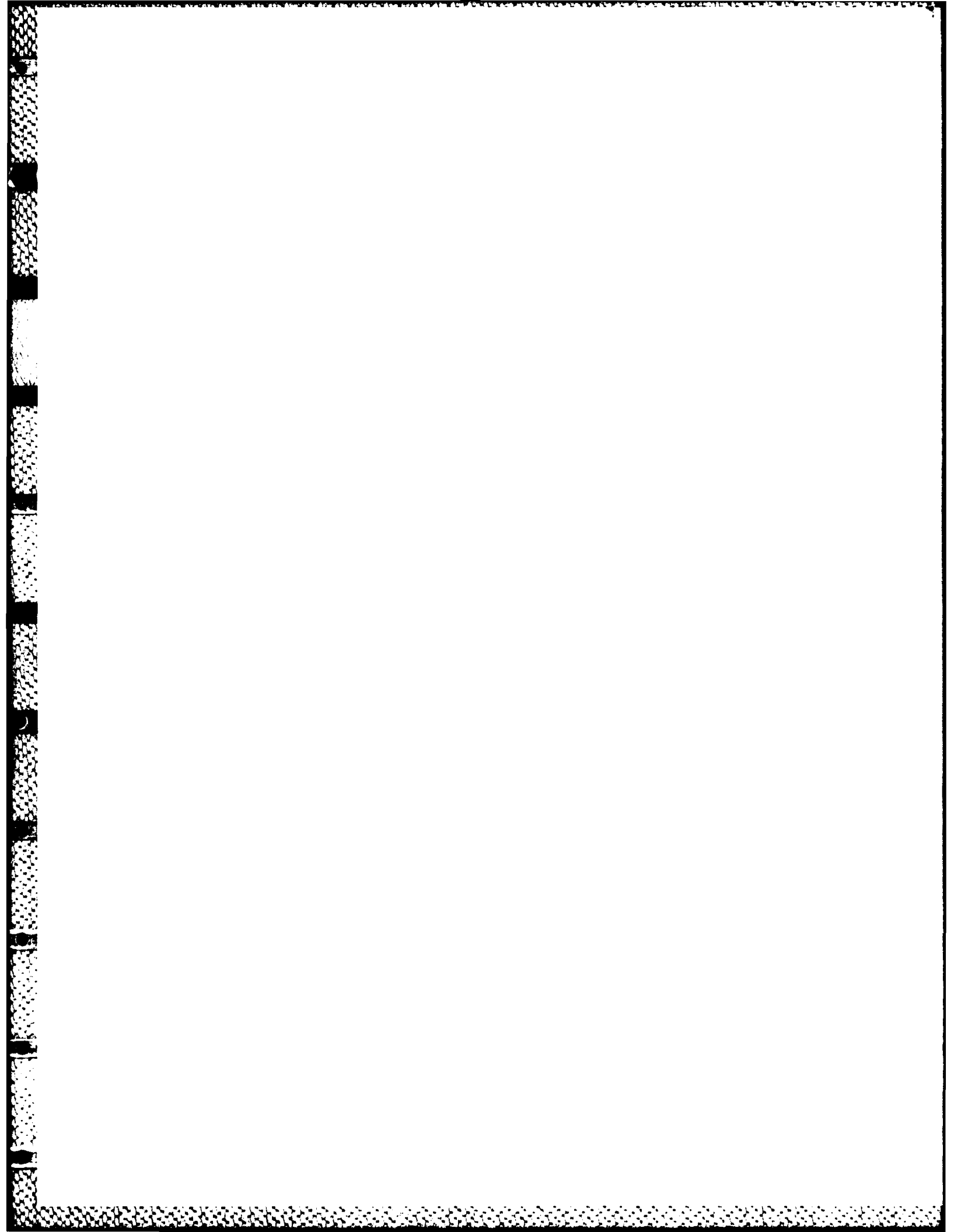
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FUELS BRANCH REORGANIZATION: A STUDY  
OF THE FUELS OFFICER AND THE FUELS ORGANIZATION

THESIS

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Logistics Management

Leon C. Spackman, B.A.

Captain, USAF

September 1985

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Leon C. Spackman



## Table of Contents

	Page
Acknowledgements .....	ii
List of Figures .....	v
Abstract .....	vi
I. Introduction .....	1
General Issue .....	1
Background .....	2
Justification .....	3
Specific Problem .....	3
Scope .....	4
Research Questions .....	4
II. Literature Review .....	6
Background .....	6
Air Force Specialty Codes .....	6
Supply and Fuels Organization .....	7
History .....	10
AFSC Consolidation .....	11
Organizational Literature .....	13
Concerns .....	15
Summary .....	16
III. Methodology .....	17
Introduction .....	17
Justification for the Survey Approach ..	17
Description of Population .....	19
Survey Instrument Description .....	20
Validation .....	21
Statistical Analysis .....	22
Definitions .....	22
Parametric vs Nonparametric Tests ..	23
Frequencies .....	24
Sign Test .....	25
Kruskall-Wallis .....	27
Summary .....	30
IV. Analysis and Findings .....	31
Introduction .....	31
Survey Response .....	31
Demographic Information .....	32
Sign Tests .....	34
Section One--Technical .....	35

	Page
Section Two--Organization .....	36
Section Three--Career Progression ..	37
Kruskal-Wallis Tests .....	38
Question 5 .....	38
Question 11 .....	39
Question 13 .....	39
Questions 15a and 15b .....	40
Question 16 .....	40
Summary of Comments .....	40
Summary .....	44
V. Conclusions and Recommendations .....	45
Introduction .....	45
Research Summary .....	45
Research Question 1 .....	47
Conclusion .....	47
Recommendation .....	47
Research Question 2 .....	48
Conclusion .....	48
Recommendation .....	48
Research Question 3 .....	48
Conclusions .....	48
Recommendations .....	49
Research Question 4 .....	50
Conclusions .....	50
Recommendation .....	51
Future Research .....	51
Senior Enlisted Fuels Personnel ...	51
Chief of Supply and DCR .....	52
Statistical Analysis .....	52
Time Factor .....	52
Summary .....	52
Appendix A: Survey Instrument .....	54
Appendix B: Survey Raw Data .....	63
Appendix C: Frequencies Program Results .....	67
Appendix D: Hypothesis Tests and Results of the Sign Tests .....	104
Appendix E: Kruskal-Wallis Tests .....	115
Bibliography .....	118
Vita .....	120

## List of Figures

Figure	Page
1. Fuels Organization .....	9
2. Kruskal-Wallis Divisions and Groups .....	29

ABSTRACT

This study attempted to determine the effect of consolidating the fuels and supply officer AFSCs. Further, it tested the possible effects of changing the existing organization to give the base fuels officer more control over factors that currently fall outside of his/her jurisdiction.

To gather information, a written survey was sent to Air Force supply officers who were either serving in fuels positions or who had at least one year of fuels experience. The data was analyzed using two nonparametric tests, the Sign Test and the Kruskal-Wallis Test. The results of these tests indicated that fuels operations have become less efficient since the AFSC consolidation, and the technical skills required of fuels officers warrant a unique AFSC. The results also indicated the fuels operation could become more efficient if first, supporting agencies were assigned to the fuels organization and second, fuels were removed from the Supply Squadron and designated as a separate organization.

FUELS BRANCH REORGANIZATION: A STUDY  
OF THE FUELS OFFICER AND THE FUELS ORGANIZATION

I. Introduction

General Issue

Fuels is a technical and diverse operation. Fuel is received, stored, tested, accounted for, and issued according to strict safety and technical directives. The fuels officer should gain a general knowledge of each of these operations through technical training and experience.

However, an area of concern in the fuels discipline is the fuels officers' lack of experience. Prior to 1979, the fuels management officer was in a unique career field. To increase career opportunities, the fuels officer Air Force Specialty Code (AFSC) was combined with the supply officer AFSC. Some senior level fuels personnel believe this consolidation contributed to a lack of knowledge and experience in fuels officers. They were concerned that the core of experienced fuels officers was being lost (6,17,23).

A second concern in the fuels area is the lack of control the base level fuels officer has over factors that affect his operation. Liquid Fuels Maintenance, Refueling Maintenance, and the Environmental Systems Branch all repair fuels equipment, but are assigned to different organizations (i.e., the Civil Engineering Squadron, Transportation Squad-

ron, and Field Maintenance Squadron, respectively). The fuels officer has little control or authority over the personnel in these organizations or the scheduling of maintenance on fuel facilities and equipment.

### Background

The fuels organization is currently a branch in the Supply Squadron. The fuels officer is subordinate to the Chief of Supply and reports directly to him/her. However, the fuels branch operates independent of Supply because of its uniqueness and specialization of its mission. The fuels officer is an accountable officer, responsible for all inventories of cryogenics and petroleum products. The fuels branch consists of an administration and accounting section, quality control, training, storage, and distribution sections. The branch relies on the Supply Squadron only for squadron administrative support. The Supply computer was formerly used to maintain the fuel accounts; however, with the Phase IV system operating, all fuels records are now in the Phase IV central base computer.

The fuels organization has not always been aligned with the Supply Squadron. In the 1950s, the Transportation Squadron controlled the fuels activities because the fuels technicians were considered truck drivers who needed no special training. The fuels organization became a separate unit in the late 1950s with several attempts to make it a Petroleum,

Oil, and Lubricants (POL) Squadron. However, these attempts failed because of organizational problems. Since the late 1950s and early 1960s, all fuels organizations have been part of the Supply Squadron (17, 19, 21).

In an effort to improve career enhancement, the Air Force began to consolidate the fuels officer AFSC into the supply officer AFSC in 1977. The field grade fuels officer AFSC was the first to be combined, with the company grade fuels officer AFSC following in 1979.

#### Justification

Until now no research has been done on the effects of the fuels and supply officer AFSCs consolidation on the base fuels operation. Recently, some senior level fuels officers have expressed concern over the possible loss of experienced fuels officers as a result of the AFSC consolidation. Additionally, fuels officers have experienced some organizational problems which need to be addressed in an attempt to improve efficiency. This thesis is an initial research effort to assess the effect of combining the fuels officer and supply officer AFSCs, and to look at organizational problems and possible changes to the fuels organization to improve its efficiency.

#### Specific Problem

This study addressed the possibility of increasing efficiency in the USAF fuels organization by researching two

different areas. First, the effect of the AFSC consolidation on the efficiency of the fuels operation was unknown. Information needed to be gathered and evaluated to determine the effect of the consolidation of AFSCs. Second, this study further attempted to determine if fuels operations might become more efficient by changing the existing organization to give the base fuels officer more control over factors that currently fall outside of his/her jurisdiction. Possible changes to the present base fuels organization needed to be evaluated to see if efficiency could improve in the fuels operation.

#### Scope

This study is limited to analyzing base level fuels organizations (ie., the fuels branch in the Supply Squadron) at operational MAJCOM bases. Officers assigned at all levels were questioned to sample a broad range of personnel with fuels experience; however, specific recommendations apply primarily to the base level fuels organization.

#### Research Questions

The following areas were used to collect and analyze data in order to evaluate the two-fold problem in the base level fuels organization.

1. Has an integration of fuels officers into the Supply



Squadron occurred or have fuels officers remained in fuels positions?

2. Do the skills required of a fuels officer (managing the receipt, storage, inspection, issue, and accounting of petroleum products) warrant a separate AFSC? If the fuels officer were assigned a separate AFSC, how would the Air Force benefit by having more knowledgeable and experienced fuels officers?

3. Does the organizational structure of the fuels branch provide the fuels officer sufficient control to operate efficiently? If not, would a different structure improve its efficiency? For example:

- Should the fuels organization be an independent organization or remain subordinate to Supply?
- Would equipment in-service rates increase with a different organizational structure, thus increasing capability?
- Would communications improve with a different structure, thus increasing service to using organizations?

4. Has the fuels officer's promotion opportunity and career progression been enhanced by being a supply officer?

## II. Literature Review

This literature review will first discuss Air Force Specialty Codes, and the supply and fuels organization. Then a short history of the fuels organization will be followed by a synopsis of the consolidation of the fuels officer AFSC with the supply officer AFSC. A review of organizational behavior literature will follow with a discussion on responsibility and authority, relating these concepts to the fuels officer and the present fuels organization. The final section briefly describes some concerns that senior fuels personnel have about the future of the fuels officer.

### Background

Air Force Specialty Codes. All personnel in the United States Air Force are assigned an Air Force Specialty Code (AFSC). For officers, this code is a four digit number that identifies the career field of each officer. The first two digits designate the utilization field or broad career area. The third digit indicates the specialty in the career area, and the fourth refers to the experience level (entry or fully-qualified). A primary AFSC (PAFSC) is assigned to an officer indicating the career field in which he or she is best qualified to perform. A duty AFSC is the AFSC of the career field in which he or she is serving (8: para 1).

The area of utilization for supply officers is designated "64." The entry level designation for the supply operations officer is 6421 and, after 18 months experience, is changed to the fully qualified AFSC, 6424. The Supply Management Staff Officer is identified by the 6411 entry level AFSC and upgraded to 6416. The supply operations officer (6421/24) includes the ranks of second lieutenant through major, and these officers usually serve as one of the branch chiefs in the Supply Squadron. The supply management staff officer (6411/16) includes the ranks of major through colonel, and they serve as commanders of Supply Squadrons or fill staff positions at a headquarters organization (9:A-17,19-22, 1:4).

The Supply Management Utilization Field is responsible for the planning and operation of supply and petroleum activities. AFR 36-1 summarizes the "64" career field:

The Supply Management Utilization Field encompasses program formulation, policy planning, direction, administration, management, and operation of all supply activities. Included in this field for assigned supplies, equipment, and petroleum products are functions of design, development, and analysis of automated or manual accounting systems; requirements determination and computation; allowances and authorizations; inventory and distribution control; accountability; reporting; stock fund operating programs preparation; and operations operating budget preparation. (9:A-17)

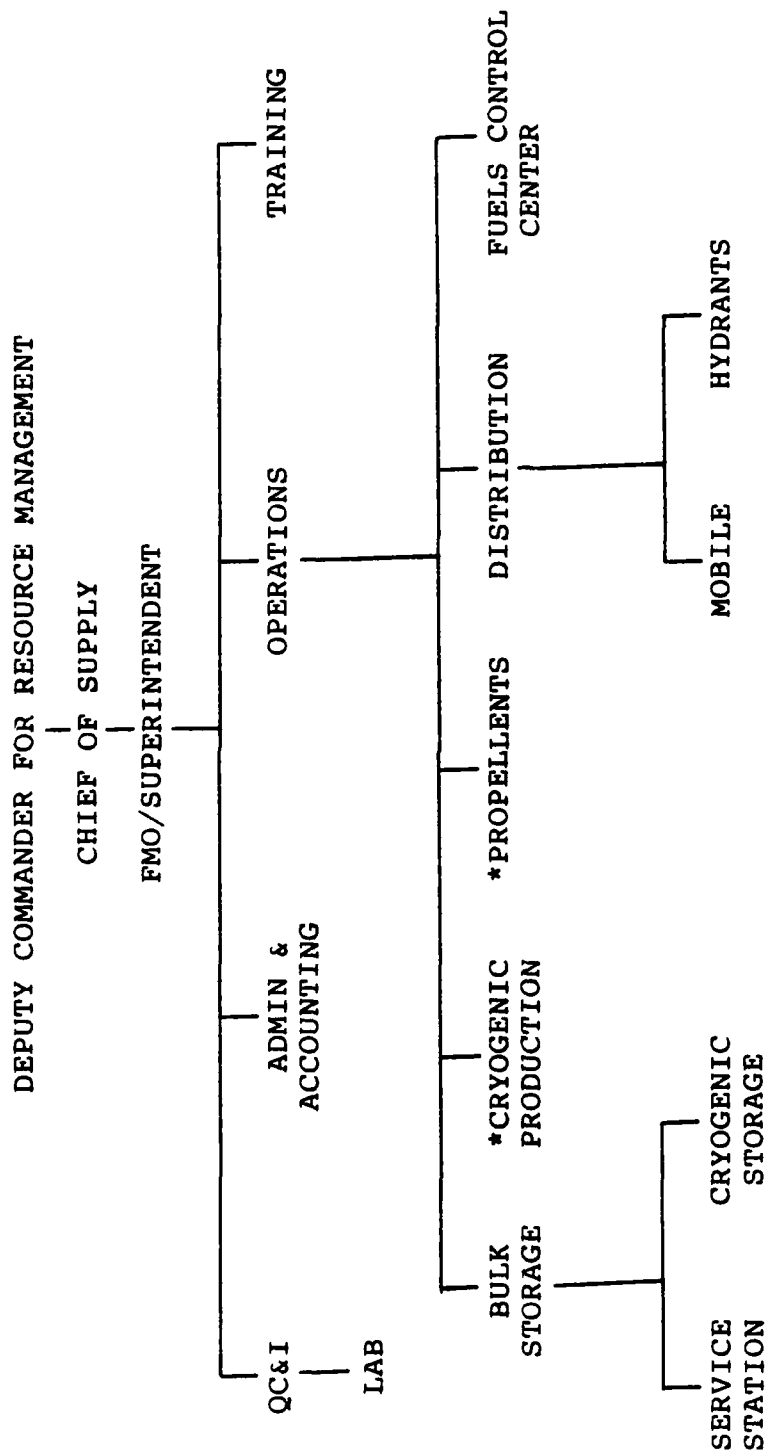
Supply and Fuels Organization. The Supply Squadron consists of five branches: Management and Systems; Operations Support; Materiel Management; Materiel Storage and Distribution; and Fuels Management. At Tactical Air Force

Bases, Operations Support branches provide for decentralized supply operations through a section which works very closely with the maintenance organizations to try to meet maintenance needs more quickly (10, 11).

The fuels officer is the branch chief of one of the largest branches in the Supply Squadron. Fuels officers carry the 64XX AFSC but are unique from all other supply officers because they are the only branch chiefs who are accountable officers. AFR 144-1 states: "The FMO (Fuels Management Officer) is appointed in accordance with AFR 67-10 as accountable officer for the Air Force Petroleum (FP) stock record account" (12:1-3). AFR 20-14, the regulation that superseded AFR 67-10, states the accountable fuels officer must have a 6416/24 AFSC, and must have attended the fuels officer course (30DR6331A-1) or have one year experience as an FMO (7:4 attach 1).

The fuels organization is responsible for delivering quality fuel to any authorized organization requesting fuel service. This includes servicing a variety of aircraft, vehicles, and fixed equipment. The fuels organization includes Operations, Quality Control, Training, and Accounting sections. Branch structure and relationships are shown in figure 1.

Many base organizations provide support to the fuels operation. However, three organizations provide direct support to the maintenance of fuels equipment. First, Liquid Fuels Maintenance (LFM), assigned to the Civil Engi-



\*WHEN AUTHORIZED

Figure 1. Fuels Organization

neering Squadron, provides maintenance support for all permanently installed fuels facilities and equipment (12:2-3). These permanently installed facilities include above and below ground storage tanks, all piping, fill stands, and fuel pumps. The second organization providing direct support to the fuels operation is Refueling Maintenance assigned to the Transportation Squadron. This shop is responsible for maintenance of the fleet of mobile fuel servicing equipment including trucks, hosecarts, and other miscellaneous portable equipment (12:2-5). The Environmental Systems Branch, normally assigned to the Field Maintenance Squadron, is the third organization that provides direct support to the fuels organization. This branch is responsible for the "intermediate-level maintenance for cryogenics containers" when cryogenics specialists are not assigned to the fuels organization (12:para 10-35). The services of these three supporting organizations contribute directly to the smooth and efficient operation of the fuels branch.

History. The fuels organization has had a varied history of organizational alignments. The basic internal structure (as outlined in figure 1) has remained fairly constant, but the organizational alignment of fuels has changed frequently.

In the late 1950s, Transportation controlled the fuels organization because refueling was considered a driver's job requiring no special training (21). In the summer of 1958, the fuels organization at Alconbury AFB, UK, was not claimed

by any organization and, subsequently, on a trial basis, was designated as the Petroleum, Oil, and Lubricants (POL) Squadron. This independent status lasted for only a short time because of the administrative burden placed on the fuels officer/commander and the fuels superintendent/first sergeant, even though the organization was very small (only 21 total people). After this trial period, the fuels organization was assigned to the Supply Squadron as a branch (19).

The fuels branch at Travis AFB was also designated as a squadron during the Vietnam conflict, but again it did not last long. Problems with the organizational structure and lack of administrative support caused the POL Squadron to be dissolved. Again, the fuels organization was placed in its present alignment with the Supply Squadron (21). In the early 1960s the Strategic Air Command assigned the fuels branch to the Aircraft Support Squadron, but by the mid-1960s their fuels branches were again part of the Supply Squadron (23).

AFSC Consolidation. During the 1950's, 60's and 70's, the fuels officer was designated by the specific AFSC 63XX. In April 1977, a consolidation of field grade fuels officers and supply officers was implemented and was designated as AFSC 6416. At that time the company grade fuels officer AFSC was changed from 6324 to 6434, placing it within the supply career field. This consolidation was done to improve

career opportunities in the fuels and supply career field. The supply officer would benefit because of the career broadening into the fuels position, thus improving his knowledge and experience in all of Supply. The fuels officer would be able to broaden his career into Supply and possibly fill a commander position, which previously was not available to fuels officers, thereby improving his chance for promotion and career progression. This initiative to enhance career opportunity was further modified in 1979 when company grade AFSCs for supply and fuels officers were combined into the single AFSC 6424 (5).

A supply officer with one year of fuels experience is assigned a Special Experience Identifier (SEI) code to designate fuels experience. Some of the fuels accounts and joint assignments require this SEI code but most fuels assignments do not require it. Therefore, a fuels officer position can be filled by any supply officer regardless of experience, provided they attend the fuels officer technical training course at Chanute AFB, IL (7:4 attch 1).

This history has discussed why the fuels officer and supply officer AFSCs were combined, and why the fuels branch is part of Base Supply. The next section will present a discussion of organizational literature to highlight the organizational problems faced by the fuels officer.



## Organizational Literature

A manager needs two elements of management to perform his job properly: responsibility and authority. Responsibility is defined by Calhoun in his book, Managing Personnel, as an "...obligation to do something" (2:50). Halloran, in Supervision: The Art of Management, defines authority as the "...power to direct workers to do or to refrain from doing something. It includes the right to take disciplinary action when subordinates refuse to do as they are told" (14:260).

Responsibility and authority are both necessary for a manager to perform effectively. When a supervisor is given responsibility to perform or oversee a task, authority must also be given. If the supervisor is not given authority to control those factors that affect the task, the operation will suffer. Calhoun said, "Success in planning depends significantly upon management's ability to predict and control the actions of its personnel" (2:47). Halloran further described this relationship of responsibility and authority:

To have the responsibility but not the authority to complete a task is an aggravating and depressing experience. It is like trying to shear a sheep, but needing permission to use the clippers every time you take a clip of the wool. Employees will eventually resent and resist supervisors who withhold authority when they delegate responsibility. No one wants to do a job unless he has some authority to carry it out. (14:260)

Two types of authority exist: line authority and functional authority. Line authority is the authority the manager has over the task and personnel for which he is responsible. Functional authority is the authority to control the particular operation but not the organizational units or personnel involved. Functional authority is usually outlined in operating procedures and regulations, and is applied by using suggestions and giving advice rather than by orders or directives. Line authority gives the manager more direct control over the entire task while functional authority gives control only for a specific operation (3:57).

How does responsibility and authority relate to the fuels officer? The fuels officer has responsibility to manage the requisition, receipt, storage, issue, and accounting of petroleum fuels, demineralized water and cryogenics (12:para 5-1). Portions of these tasks are directly under the fuels officer's control. For example, the fuels officer has complete control over all fuel issued. The personnel who issue fuel are directly subordinate to the fuels officer and can be reprimanded if the established safety guidelines are not followed. Thus, in this case, the fuels officer has both responsibility and authority.

However, other portions are outside the direct control of the fuels officer, giving him/her only functional authority to get the task done. AFR 144-1 lists the following responsibility of the FMO: "Coordinate with base agencies to ensure adequate support of fuels personnel, equipment,

and facilities (12: para 5-1,j)." An example is coordinating with Liquid Fuels Maintenance to repair a malfunctioning fuel pump. The fuels officer can only request support and advise, yet he/she has the responsibility to ensure fuel is issued on time. Therefore, in this case, a fuels officer has responsibility but no authority. He can only suggest and give advice to those support agencies that provide direct service to the fuels branch, and thus affect the overall accomplishment of the refueling mission.

#### Concerns

Many senior level fuels personnel feel the consolidation of the fuels officer AFSC (63XX) with the supply officer AFSC (64XX) was a mistake because fewer field grade positions are being filled by officers with past fuels experience (4,5,6,17,22,23). Field grade levels of fuels management require a solid background of knowledge and experience, especially in the Office of the Secretary of Defense (OSD), Office of the Joint Chief of Staff (OJCS), Air Staff, Major Commands, Defense Fuel Supply Center and Unified Command Joint Petroleum Offices. Colonel Gomer C. Custer, Chief of the Energy Management Branch, HQ USAF, stated in a January 1982 letter: "Of the last eight individuals serving as Chief of the Energy Management Branch at the Air Staff and the Director for Energy Management at San Antonio ALC, only two have come from the traditional petroleum com-

munity..."(5). Without experienced fuels officers, these important management positions will be filled by those who do not have the necessary skills and knowledge to properly manage fuel resources (5).

#### Summary

This literature review has discussed the general background of the fuels organization, beginning with a description of pertinent Air Force Specialty Codes (AFSC). Briefly described next were the organizational relationships of supply and fuels, and a history of the fuels organization. The background section contained a synopsis of the consolidation of the fuels officer AFSC with the supply officer AFSC which was completed in 1979. The organizational literature discussed the relationship between responsibility and authority, and related it to the fuels officer and the current organizational structure. The final section reviewed some of the concern expressed by senior fuels personnel, highlighting the lack of experience, especially at the field grade level.

### III. Methodology

#### Introduction

This thesis addresses the consolidation of the fuels and supply officer AFSCs and the organization of base fuels. A background of the fuels organization has been discussed and the related literature has been reviewed. The next step is to decide on a method to gather information on current operations, and the perceptions of fuels officers; then analyze it properly. The survey method was chosen to gather information, and hypothesis testing was chosen to analyze the data using two nonparametric tests: the Sign Test and the Kruskal-Wallis Test. The Statistical Package for the Social Sciences (SPSS) located on the Harris 800 computer at the Air Force Institute of Technology, Wright-Patterson AFB, OH, was used for the statistical analysis.

#### Justification for the Survey Approach

Nothing has been written about the effect on the fuels organization of consolidating the fuels officer and supply officer AFSCs. Further, no studies have been done to determine the success of the integration on promotion opportunities for the supply officer who once was a fuels officer. Also needed was an indication of whether fuels officers perceive possible organizational changes would improve the efficiency of the base fuels operation. To gather information in these areas, supply officers who have had experience

in fuels were questioned about their experience and opinions on the effect of the consolidation of AFSCs and possible reorganization of the fuels branch. This questioning or interrogation process is defined as surveying (13:214).

Surveys can be performed using a personal mode or an impersonal mode. The personal mode consists of one-to-one interviews with individuals chosen for the survey. The interviewer uses a structured set of questions or simply a list of topic areas to be discussed. The answers are recorded by the interviewer. In the impersonal mode, the researcher uses a written questionnaire which is mailed to a selected population or sample of interest. The respondent completes the questionnaire and returns it to the researcher for analysis. A combination of the personal and impersonal mode may also be used to receive the benefits of both types (13:214,215).

The personal interview survey has the highest average rate of response (81.7%), while the telephone survey achieves nearly the same response rate (72.3%) [25:39]. However, these two survey methods are expensive both in interview time and cost involved to accomplish the survey. The personal survey has the negative effect of interviewer bias while the telephone survey is limited by the quick answers that the respondent must give. The impersonal survey, or questionnaire, has a built-in bias because of the set format of the questions. The questionnaire also has the

lowest response rate; however, it is the least expensive survey method. Leslie Kanuk and Conrad Berenson discussed the advantages of the mailed survey in their article, "Mail Surveys and Response Rates: A Literature Review:"

Market researchers have long recognized the obvious advantages of mail questionnaire surveys. They are relatively low in cost, geographically flexible, and can reach a widely dispersed sample simultaneously without the attendant problems of interviewer access or possible distortions of time lag. Difficult to reach respondents, such as farmers, soldiers, or busy executives, can be surveyed with relative ease. (16:440)

Considering all survey possibilities, the mail survey was selected as the tool to collect the needed data. A major concern was the low response rate associated with mailed surveys, especially since the population to be sampled was quite small (only 171 potential respondents). If 35 percent responded to the survey, only 70 surveys would be returned, leaving a question about the bias of those who did not answer. However, AFIT surveys have, in the past, received excellent support from respondents with response rates that often exceed 75% (1:23).

#### Description of Population

The population under consideration was all supply officers (AFSC 64XX) who had fuels experience. This included all officers currently serving in a fuels position, and those officers with a Special Experience Identifier (SEI) of "LLI", identifying at least one year of fuels experience. In order to get a representative cross-section of opinions

and data, it was necessary to include those who had extensive experience in the fuels area as well as those who were fairly new to the job. Therefore, the questionnaire was sent to the entire population in order to ensure a representative sample and avoid skewness in the data collected.

#### Survey Instrument Description

The survey instrument was divided into four sections, one for each research question. The first three sections use a seven-point Likert scale as a measurement of the opinions solicited. Section four asks for demographic and personal information. All questions were designed to be answered easily using a Likert multiple choice scale. A separate sheet was attached for written comments from the respondents.

A Likert scale was used because it allows the respondents to rate their level of agreement with each statement rather than respond with simply a yes or a no. The scale used in this study consisted of seven levels: strongly disagree, disagree, slightly disagree, neither agree nor disagree, slightly agree, agree, and strongly agree. The Likert scale is effective in measuring how responses differ between people and to show if respondents are more or less favorable on a topic. The Likert scale is useful if an experiment was conducted, or when investigating a program of change or improvement (13:272-274). Thus, the Likert scale



was selected because it is simple to use and effective in measuring the information desired.

The purpose of the first section in the survey was to determine if the fuels officer position warrants a separate AFSC and the possible effect of a unique fuels officer AFSC on the efficiency of the fuels organization (Research Question #2). The second section was developed to ascertain if a different organizational structure could improve the efficiency of the fuels operation (Research Question #3). The third section was used to assess career enhancement and promotional opportunity for the fuels officer with a supply officer AFSC (Research Question #4). The final section was included to collect historical data and to investigate to what extent fuels officers have been integrated into the supply career field (Research Question #1).

After the survey instrument was constructed, it needed to be validated to ensure it measured what it was intended to measure.

#### Validation

The survey instrument was validated through review and analysis by three different groups of people. First, the survey was given to instructors on the AFIT staff with background and experience in constructing surveys. These faculty members validated the question order, structure, and content. Second, the survey was given to two officers assigned to Wright-Patterson AFB who had fuels experience.

This was an attempt to validate the content and understandability of the instrument by members of the sample group. Finally, the survey was given to five AFIT students with supply officer AFSCs. These officers had related backgrounds with those of the respondents. They checked for comprehension and readability.

Once the instrument was validated, a method of statistical analysis was necessary to test the results of the survey. This method is discussed in the following section.

### Statistical Analysis

Definitions. This section defines the type of data collected and the type of testing performed on the data. All data was ordinal, since the results were measured on a Likert scale, which by definition is an ordinal scale (13:274). Ordinal data has order or rank meaning; therefore, the measure of central tendency used was the median, and percentiles and quartiles could be employed for measuring dispersion.

The median "is a number such that half the measurements fall below the median and half fall above" (18:59). The median is calculated by arranging the data in ascending order and then finding the middle number. If the number in the data set is odd, the median is the middle number. If the number in the data set is even, the median is the mean of the two middle numbers. In some situations the median is

a better measure of central tendency than the mean, especially if the data is skewed heavily to one side. For example, the median yearly sales for a group of companies would find the middle of the sales data. However, the mean would be influenced heavily by the large yearly sales of a few companies, making it deceptively large (15:24, 18:60-61).

Statistical analysis of the ordinal data should be limited to the nonparametric methods that deal with rank-order analysis (13:123). The analysis of the data for this thesis was based on the technique of hypothesis testing. This method states two hypothesis, opposite of each other. The first is the null hypothesis which defines the statement to focus on. It generally includes the statement "there is no difference"--thus it is called the "null" hypothesis. The second hypothesis is called the alternate hypothesis. It is opposite of the null hypothesis and states what the researcher wishes to show. Thus, the researcher wants to reject the null hypothesis in favor of the alternate (15:274).

Parametric vs Nonparametric Tests. Historically, the first statistical tests that were performed made assumptions about the population "parameters" and were called parametric tests. Later, tests were developed which made no assumptions about the parameters of the population. These tests were called nonparametric tests (24:23). Parametric tests are generally more powerful than nonparametric tests; how-

ever, nonparametric tests "provide more general comparisons of populations than parametric methods, because they compare the probability distributions of the populations rather than specific parameters." (18:712). If the level of measurement is less than interval (the data analyzed in this study is only ordinal) the parametric tests would add information to the analysis, thus distorting the outcome. Nonparametric tests can achieve the same power as parametric tests by increasing the size of the sample. Therefore, nonparametric tests are appropriate to use when the assumptions about the population parameters cannot be made to perform a parametric test (24:31-32).

A number of routines were available for data analysis in the Statistical Package for the Social Sciences (SPSS). First, a program called "Frequencies" was used to report the results of the survey data. Second, two nonparametric tests were selected to analyze the collected data: the Sign Test and the Kruskal-Wallis Test. These routines are described below.

Frequencies. The Frequencies program provided the capability to report the results of the collected data, showing the number of responses in each category for every question. The output of this program could be arranged using nine different options including charts, tables, and histograms. It also had the capability to calculate statistical information such as the mean, median, and range if

desired (20:194-201). The median was calculated for each question and the results shown as histograms. The results are found in appendix C.

Sign Test. The sign test is a binomial test used to compare the median of two populations with paired variables. This test consists of four main steps:

1. Determine the sign of the difference between each pair of data. If the data point in sample A is greater than the paired data point in sample B, then a plus sign (+) is assigned; if the data point in sample A is less than the data point in sample B, a minus sign (-) is assigned. If the data points are equal, the data is discarded since the difference is (0). For this study, sample A was the actual response on the survey and sample B was the middle of the Likert scale, "4".

2. Count the total number of (+)s and (-)s. This yields an N sample size of (+)s and a separate N sample size of (-)s.

3. Determine the probability associated with the occurrence under the null hypothesis of a value at least as extreme as the computed z for the null hypothesis. If N is larger than 25, the normal approximation to the binomial distribution can be used. Compute the z value for the normal distribution using the following formula:

$$z = \frac{(x \pm .5) - N/2}{\sqrt{N/2}} \quad (24:72)$$

Where: x = the number of the fewer signs.  
 (NOTE: When: (x < N/2) use x +.5; when (x > N/2) use x -.5.)

The probability (p) of a value occurring as extreme as the computed z can be taken from a Normal Distribution Table. For a two tailed test, double the value of the probability as shown in the Normal table.

4. If the probability derived from the test is less than or equal to the alpha level set for the test, then reject the null hypothesis (24:68-75, 15:490-495).

In this study, the sample median for each question was compared with the median Likert scale of "4". The null hypothesis for all questions was:

Ho: The median of the sample data does not differ from "4" on the Likert scale.

This study assumes that a definite difference in agreement did exist. Therefore, the alternate hypothesis was:

Ha: The median of the sample data does differ from "4" on the Likert scale.

All sign tests were one-tailed with the null hypothesis stating the expected direction of agreement. By comparing the median value of "4" with the survey responses, (+)s and (-)s were assigned. For example, if the survey median was greater than "4", a (+) was assigned. If the response was a "4", the data was discarded, since the difference was (0).

Since some data was discarded, a criterion level for validity was set. If 20 percent of the responses were "neither agree nor disagree" or 4, the question was considered invalid. An alpha level of .05 was selected for testing all hypotheses. The results of the tests are reported in Chapter Four and in appendix D.

Kruskal-Wallis. This test compares two or more populations to see if their survey answers have identical probability distributions. The null and alternate hypotheses are:

Ho: All populations have identical distributions.

Ha: At least one probability distribution differs in location.

To perform the test, the data from all populations is ranked in order from the least to the highest. If ties occur, the average value of the ranks is assigned to each of the tied observations. The test statistic is calculated using the following formula:

$$H = \frac{12}{n(n+1)} \left( \sum_{j=1}^k \frac{R_j^2}{n_j} - 3(n+1) \right) \quad (18:693)$$

where:

$n_j$  = the number of measurements in the  $j$ th sample

$n$  = the total sample size =  $n_1 + n_2 + \dots + n_k$

$R_j$  = Rank sum for sample  $j$  where the rank of each measurement is computed according to its relative magnitude in the data for the  $k$  samples.

Rejection region:  $H > \chi^2$  with  $(k - 1)$  degrees of freedom

(18:690-693; 24:184-193).

The Kruskal-Wallis Test was very useful for evaluating how different groups of respondents answered the survey questions. The respondents were divided into four distinct groups as outlined in figure 2, and their responses were compared. The first division grouped respondents according to rank. First and second lieutenants were combined for group one, captains made up group two, majors comprized group three and lieutenant colonels and colonels were combined for group four. The lieutenants and colonels were combined in order to have sufficient numbers in each of their groups to perform the Kruskal-Wallis Test. The second comparative division formed two groups: those respondents with over four years of fuels experience and those with less than four years of fuels experience. The third division separated the respondents into two groups: those with only fuels experience and those with experience in other areas of supply. The final division was according to current assignment: group one--those currently serving in a supply position; group two--those currently in a fuels staff position; and group three--those currently serving as base fuels officers regardless of the number of fuels personnel were assigned.

The null and alternate hypotheses for each of the individual Kruskal-Wallis Tests are in appendix E.



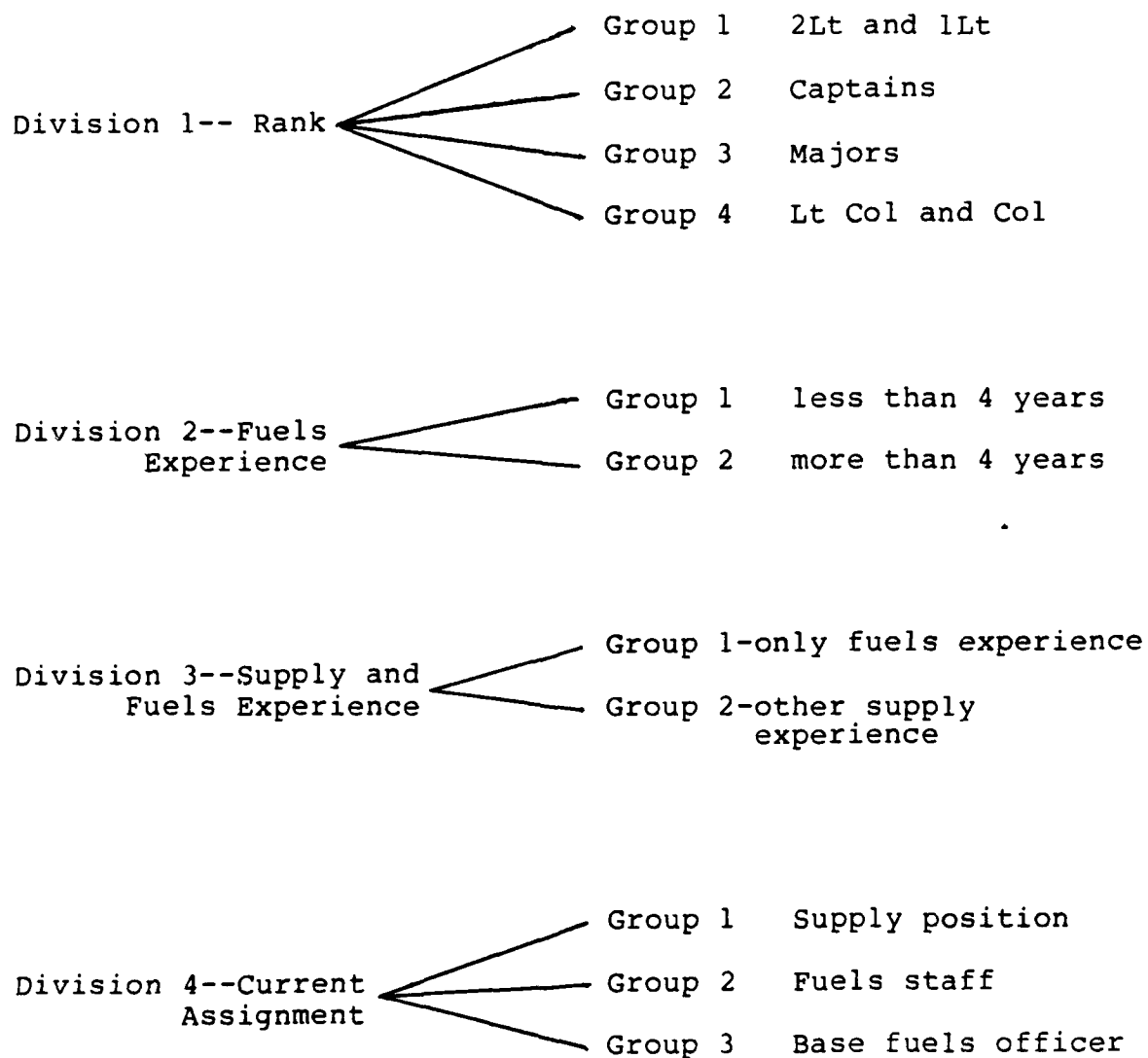


Figure 2. Divisions and Groups for the Kruskal-Wallis Test

## Summary

This chapter has outlined the methodology used to solve the research questions of this study. First, use of the mail survey was justified, discussing the advantages and disadvantages of survey methods. Next, the population of interest was defined as all supply officers with fuels experience. The third section described the actual survey instrument and what it attempted to measure. Fourth, the statistical analysis was set forth, parametric versus non-parametric tests were briefly discussed, and then a description of the two tests used in this study, the Sign Test and the Kruskal-Wallis Test, followed.

#### IV. Analysis and Findings

##### Introduction

This study addressed two basic areas concerning the Air Force base fuels organization and fuels officers. First, what was the effect of the fuels and supply officer AFSC consolidation on the efficiency of the fuels operation. Second, what organizational changes could increase the efficiency of fuels by giving the base fuels officer more control over factors that affect the fuels operation. Information was gathered through the use of a written survey sent to all supply officers serving in a fuels position and to all supply officers assigned the fuels SEI, which requires one year of experience as a fuels officer. This chapter will report the results of the survey and the analysis completed on the data using the nonparametric Sign Test and Kruskal-Wallis Test described in Chapter Three.

##### Survey Response

One-hundred-seventy-one surveys were mailed on 8 April 1985 to the selected supply officers. Three were returned unanswered because of incomplete or undeliverable addresses. By 5 June 1985, 145 useable surveys were returned for a response rate of 86 percent. The author assumed that the responses were representative of the entire population of 171 potential respondents, and therefore comprised a suitable sample for analysis.

The data from the surveys were manually recorded and then entered into the Harris computer for analysis. The SPSS program, "Frequencies", was used to report the responses to each question on the survey. These responses are in Appendix C. Surveys that contained written comments in the comments section were sorted in order to combine and report them. These comments will be reported later in this chapter.

#### Demographic Information

This information was collected in an attempt to answer Research Question #1. Of the 145 respondents, 6.2% were second lieutenants, 9.7% were first lieutenants, 53.1% were captains, 17.9% were majors, 11% were lieutenant colonels, and 2.1% were colonels. At the organizational level, 56.6% were assigned to squadrons, 4.1% to numbered Air Forces, 14.5% to major commands, and 24.8% to other levels (mostly to DOD/HQUSAF).

The largest number of respondents were assigned to USAFE with 19.3%, followed by SAC who had 15.9%, then TAC with 14.5%, MAC with 9%, PACAF with 7.6%, AFLC with 6.2%, ATC with 3.4%, AAC with 3.4%, AFSC with 1.4%, SPC with .7%, and other (again mostly DOD/HQUSAF) with 18.6%.

In past assignments, 55.9% of the respondents had been assigned to SAC, 46.9% to PACAF, 39.3% to TAC, 37.9% to USAFE, 36.6% to ATC, 31.7% to MAC, 12.4% to AAC, 11.7% to

AFLC, 5.5% to AFSC, 1.4% to SPC, and 18.6 to other commands such as ADC or Joint Commands.

Seventy-four percent of the respondents were currently serving in a fuels position. By fuels experience, 4.8% had less than one year experience as a fuels officer, 13.8% had one year but less than two years of fuels experience, 9.0 % had two years but less than three years of fuels experience, 9.7% had three years but less than four years of fuels experience, and 62.8% had over four years of fuels experience. Those with more than four years experience averaged 11.8 years of experience as a fuels officer.

Nineteen percent of the respondents had been assigned to fuels, then to a supply position, and then back to a fuels position. Ninety percent had attended the fuels technical training course and 55% percent had attended the supply operations officer course. Forty-nine percent of the respondents had attended both the fuels technical training course and the supply operations officer course.

Forty percent of the respondents had worked in other branches of Supply, the most common being customer support (27.8%) followed by materiel management (25.7%), management and procedures (18.8%), storage and distribution (13.9%), systems (.7%), and other (mostly Chief of Supply or Assistant Chief of Supply) (13.2%). Thus, many fuels officers have had other supply experience. However, 60% had only fuels experience, suggesting that a total integration of fuels officers into supply may not have occurred.

By current assignment, 25.5% were in a supply position, 29.7% were in a fuels staff position, and 44.8% were assigned as base fuels officers. Of those assigned as base fuels officers, 4.6% had less than 30 subordinate fuels personnel, 7.7% had 30 or more but less than 50, 16.9% had 50 or more but less than 70, and 70.8% had over 70 fuels personnel subordinate to them.

The next two sections will describe how the remaining research questions were answered.

#### Sign Tests

The SPSS program "Sign Test" was used to analyze the responses to the first three parts of the survey. Each question was analyzed using an alpha of .05 for a one-tailed test. The SPSS program gives only a two-tailed probability; therefore the significance level used was .025 (.05/2).

Appendix D contains the null and alternate hypotheses for each question and the number of respondents who agreed, disagreed, and neither agreed nor disagreed with each question. The z statistic is recorded as well as the two-tailed p value. The z value is the computed statistic based on a normal distribution. The two-tailed p value is the probability "of observing a value of the test statistic that is at least as contradictory to the null hypothesis, and as supportive of the alternative hypothesis, as the one computed from the sample data" (18:295). Therefore, if the

derived two-tailed p value was less than .025, the null hypothesis was rejected in favor of the alternate hypotheses. If the two-tailed p value was greater than or equal to .025, the null hypothesis was not rejected.

Section One--Technical. The first section of the survey was used to determine if the fuels officer position warrants a separate AFSC, and the potential effect of a unique fuels officer AFSC on the efficiency of the fuels organization (Research Question #2). The results of the Sign Test seem to indicate the the fuels operation has been less efficient since the consolidation of the fuels and supply AFSCs. Further, safety incidents have increased and the quality control program has become weaker. Survey questions 2b and 2c were not analyzed because more than 20% of the respondents neither agreed nor disagreed, which made it impossible to make a definite conclusion on the effect of the AFSC consolidation for these areas.

The results further indicate that fuels operations would benefit by having an experienced fuels officer with a unique AFSC. Further, the fuels safety record, quality control program, and accounting functions would all improve by having an experienced fuels officer with a unique AFSC. Question 4c again had more than 20% of the respondents neither agree nor disagree.

The results strongly indicated that the technical skills required of a fuels officer justify a unique AFSC.

Section Two--Organization. This section was used to determine if a different organizational structure could improve the efficiency of the fuels operation (Research Question #3). Questions 6 through 8 dealt with combining outside service organizations with the fuels organization. Results indicate two benefits could occur if Liquid Fuels Management were part of the fuels organization. First, the in-service rate of stationary equipment could improve; and second, fewer safety violations would occur. The results also suggest that increased cryogenic service could be provided if these experts were assigned to the the fuels branch to maintain the cryogenic equipment.

Question 9 addressed improved communications assuming base fuels became an independent organization. According to the results, communications might improve with the Deputy Commander for Resources, the Deputy Commander for Maintenance, and the Wing Commander if fuels became a separate organization.

Question 10 asked if service from the supporting agencies (Refueling Maintenance, Liquid Fuels Maintenance, and Cryogenics) would improve if fuels became a separate organization, but did not include these supporting agencies. The results indicated that service might improve from all three supporting agencies if fuels were made a separate organization.

Questions 11 and 12 discussed the independence of the fuels organization and its placement within the base manage-



ment structure. An independent fuels organization subordinate to the Deputy Commander for Resource Management was strongly supported. Leaving fuels assigned to the Chief of Supply was definitely unacceptable; however, the results were uncertain on making fuels subordinate to the Deputy Commander of Maintenance.

Section Three--Career Progression. This section was used to determine if the fuels officer's promotion and career opportunities have been enhanced by having a supply officer AFSC (Research Question #4). Question 13 asked the respondents if their career progression had been enhanced by the consolidation of the supply and fuels officer AFSC. More than 20% (41) of the respondents neither agreed nor disagreed making it statistically infeasible to make any conclusions. Sixty of the respondents, or 41%, disagreed and 44, or 30%, agreed that the consolidation had enhanced their career. It therefore appears that fuels officers as a group do not agree that the consolidation has improved their career progression. It may be too early to tell if the AFSC consolidation has really augmented career progression for the fuels officer.

Question 15 also addressed career progression and asked respondents if their fuels experience had enhanced their career progression. Results indicate that fuels experience has enhanced career progression and more strongly, total military experience.

Sixty-five percent of the respondents wanted to be assigned to a fuels position and seventy-seven percent would stay in fuels if it were made a separate organization, evidenced by the answers to question 14 and 16.

#### Kruskal-Wallis Tests

Because of the number of questions on the survey and the time constraint on the author, six main questions were chosen to be analyzed with the Kruskal-Wallis test. One question each was analyzed from sections one and two, and four questions were used from section three. These questions were selected because they treat the fundamental research questions of this study.

The Chi-Square statistics and the significance levels for each question and group are recorded in Appendix E. (Note: The rank score referenced in the following sections is the sum of each group's rank after the data has been combined and ranked from the lowest to the highest. For further clarification on the Kruskal-Wallis Test, see Chapter Three.)

Question 5. Question 5 asked if the technical skills required of a fuels officer justify having a unique AFSC. All groups in all divisions answered this question the same way, except those with only fuels experience. The rank sum of that group was higher than those with other supply experience; therefore they felt more strongly that the technical skills required of a fuels officer justified a unique AFSC.

Question 11. Question 11 addressed the issue of separating the fuels organization from the supply squadron and making it a unique organization. There was no difference in the way any of the groups answered this question, which means they all felt equally that fuels should be separate from supply.

Question 13. Enhancement of career progression as a result of the consolidation of the supply and fuels officer AFSC was the subject of question 13. Groups answered differently in every division of responses. By rank structure, the fourth group (the colonels) significantly differed from the first three. They had the lowest mean rank score showing that they felt more strongly that the consolidation of AFSCs did not enhance their career. By length of fuels experience, those with over four years of fuels experience differed significantly and had the lowest mean rank score, again stating more strongly that the consolidation of AFSCs did not enhance their career. The group consisting of those respondents with only fuels experience also answered differently, with a lower mean rank score showing their disagreement with the question of career enhancement. Finally, respondents in fuels staff positions differed significantly from the other groups. They had the lowest mean rank score, again showing their answers were more negative than the other respondents.

Questions 15a and 15b. Questions 15a and 15b approached the fuels experience from a more general viewpoint. They asked if the fuels experience had been a benefit first, to career progression (15a), and second, to total military experience (15b). No groups' answers were significantly different from the others in each division of responses.

Question 16. Question 16 asked if the respondent would stay in the fuels career field if the fuels branch were made a separate organization. Only one group's responses differed significantly from the others: those respondents with more than just fuels experience. Their mean rank score was lower than those with only fuels experience, meaning that those who had other supply experience did not feel as strongly about staying in fuels if it were made an independent organization.

#### Summary of Comments

Nearly half of the 145 respondents added comments about changing the fuels organization and making fuels a unique career field. The comment that occurred most often was a concern about career progression. Twenty officers expressed worry about the unstable future of a pure fuels officer. Many stated that if career progression was more positive they would not hesitate to stay in fuels.

The next most common comment stated that fuels was a unique area. It was frequently stated that fuels officers

are not supply officers; the job is totally different. One officer said:

It has been my dream for a quarter of a century for fuels to become a separate organization devoted to our primary reason for being--generating aircraft... Planes can and do fly with parts missing or not functioning, but I've never known one to fly without fuel... In every war, the material that powers the war machine, whether it be hay for horses or fuel for airplanes, has been the key to victory or defeat! I hope that fuels will someday come out from supply, where they have been malassigned for years, and into their own. I hope my tired old eyes see that day!!

Other respondents discussed the technical side of the fuels career field and how it differs from supply. One commented, "The handling of bulk petroleum requires intensive management and stringent adherence to technical data and safety standards." Eleven respondents commented that the fuels officer needed to have control over Liquid Fuels Maintenance and Refueling Maintenance. One officer expressed frustration when he said:

I don't mind working for the Supply Squadron, but what is really frustrating is having to depend on so many people to keep my facilities and equipment in order and having absolutely no control over how, when and where they do it. I would compromise and work for supply if I could have LFM, Refueling Maintenance and Cryogenics under my direct supervision.

Closely associated with the idea of control, eight respondents liked the idea of a Fuels Squadron to include Liquid Fuels Maintenance, Refueling Maintenance and Cryogenics. This would give both the control and the autonomy discussed earlier in this study.

Six officers expressed concern that presently there are not enough high ranking officers to staff a fuels squadron. A first lieutenant or even a captain may not have enough experience and influence to command a squadron properly.

Ten respondents wanted Fuels to be subordinate to the Deputy Commander for Maintenance since fuels is tied so closely to the flightline and to generating airplanes. However, two officers felt that option would be unacceptable.

Eight officers were in favor of a unique fuels AFSC in order to stabilize the experience level of fuels officers. Several stated that supply officers are being rotated through the fuels position every 18 months. This rotation would only give an introduction to the fuels area and not provide the experienced fuels officers needed to fill top level fuels management positions.

Seven comments were written about the relationship of the Chief of Supply to the fuels officer. The basic feeling was that the Chief of Supply knows little about fuels and does not have the initiative to learn. One fuels officer expressed frustration with this situation when he said:

I feel that I am a step child of supply for most of the time, who gets left alone by most Chiefs of Supply, who don't want (to) or feel they don't have the expertise to handle fuels related problems. By making fuels a separate AFSC and organization you would probably be legitimizing what in practice exists at most fuels operations.

Another officer described the relationship of the fuels officer to the Chief of Supply this way:

It is complicated and difficult for the FMO to sign for the Fuels account and be under a squadron commander who is signed for the rest of the Supply account. This system doesn't work effectively. The FMO is held responsible yet not given the authority. At first glance, it would seem that this situation could help the FMO (rather) than hinder; yet, it doesn't. We're putting our FMO's on the chopping block and giving the cleaver to a badly influenced bystander.

One respondent stated that he may be required to pull an overseas assignment in supply because of the consolidation. Another said that he couldn't get the jobs he wanted as a result of the consolidation of AFSCs. In contrast to the opposition to the consolidation, several respondents commented that they were better officers for having both fuels and supply experience. One officer who had been in fuels and then in supply, said that in his case, more of his potential had been realized in supply.

Three suggestions were given to change the present system in a different manner than the survey suggested. The first and least radical was to simply require supply officers to attend both supply and fuels school, thus giving them the skills necessary to function in either position. The second suggestion was to establish a gate system similar to the system for rated officers. This plan would require that the fuels officers stay in fuels for a designated amount of time to develop the needed skills and experience for some of the senior level jobs. The third recommendation was to dissolve the current structure and remove the fuels officer completely, making fuels an operational branch of

supply. The fuel accounting and ordering functions could be given to Materiel Management and quality control responsibilities placed in the Management and Systems branch.

#### Summary

Overall, there were strong feelings about the advantages and disadvantages of the current fuels organization evidenced by the high response rate and the large number of comments. The general feeling of the respondents was first, the fuels operation had not benefitted by the AFSC consolidation and would profit by having experienced officers with a unique AFSC. Second, a separate organization with support agencies subordinate to the fuels officer would also increase efficiency and improve the service provided by the fuels organization.



## V. Conclusions and Recommendations

### Introduction

This final chapter will first review the research which was completed for this study. Second, conclusions will be discussed based upon the research findings, and finally, recommendations will be given for changes to the current system and for further research.

### Research Summary

The fuels organization is currently a branch in the Supply Squadron. Historically, the fuels organization has not always been aligned with Supply. In the 1950s, the Transportation Squadron controlled the fuels activities because the fuels technicians were considered truck drivers requiring no special training. Attempts were made at organizing a POL Squadron but each attempt failed. Fuels was part of the Aircraft Generation Squadron in the early 1960s, but since the middle 1960s all fuels organizations have been part of the Supply Squadron.

Three support agencies outside the fuels organization maintain fuels equipment. The fuels officer has the responsibility to operate efficiently, but has no authority over the agencies dedicated to fuels equipment maintenance.

In an effort to improve career enhancement for the fuels officer, the Air Force began to consolidate the fuels

officer AFSC into the supply officer AFSC in 1977. The field grade AFSC was the first to be combined, with the company grade AFSC following in 1979.

This study addressed the possible increase of efficiency in the fuels organization. First, it attempted to determine the effect of the AFSC consolidation on the efficiency of the fuels operation. Second, it tested the possible effects of changing the existing organization to give the base fuels officer more control over factors that currently fall outside of his/her jurisdiction.

The following research questions were used to evaluate the problem areas in the fuels organization.

1. Has an integration of fuels officers into the Supply Squadron occurred or have fuels officers stayed in fuels positions?
2. Do the skills required of a fuels officer warrant a unique AFSC?
3. Does the organizational structure of the fuels branch provide the fuels officer sufficient control to operate efficiently? If not, would a different structure improve its efficiency?
4. Has the fuels officer's promotion opportunity and career progression been enhanced by being a supply officer?

To gather information, a written survey was sent to Air Force supply officers who were either serving in fuels positions or who had at least one year of fuels experience. Of the 171 surveys sent, 145 were returned for analysis.

The data was analyzed using two nonparametric tests, the Sign Test and the Kruskal-Wallis Test. The Sign Test was used to test if the median of the data for each question differed from the center of the Likert scale, "4". The Kruskal-Wallis Test was used to see if different groups of respondents answered differently. The following conclusions and recommendations are based on the findings of these tests and the comments made by the survey respondents.

#### Research Question 1

Conclusion. An integration of fuels officers into the Supply Squadron has not taken place. Only 26% of all supply officers with fuels experience are now serving in a supply position. Only 40% of the respondents have worked in other areas of supply leaving 60% who are still strictly fuels qualified supply officers. 19% of the respondents had been in fuels, then served in a supply job, and then returned to fuels. These facts seem to indicate that once an officer serves in a fuels position, he/she will probably be assigned there again and perhaps receive no other experience in the supply career field.

Recommendation. Since the fuels officers have not truly been integrated into the Supply Squadron, a separate AFSC should be awarded to the fuels officer. This will maintain the fuels officer experience level and provide stability in the career field.

## Research Question 2

Conclusion. The skills required of a fuels officer warrant a unique AFSC. Eighty-six percent of the respondents agreed that the fuels officer should have a unique AFSC because of the technical nature of the fuels officer's duty. The fuels operation could become more efficient with experienced fuels officers possessing a unique AFSC. Safety incidents and accounting errors could decrease, and the quality control program could be more effective.

Recommendation. Because of the technical nature and the unique function of the fuels officer, a separate AFSC should be awarded to the fuels officer. This separate AFSC would provide stability for the fuels officer corp allowing officers to gain knowledge through experience and dedication to a single career field. Senior level fuels positions would be filled by capable, experienced officers providing sound management for petroleum products.

## Research Question 3

Conclusions. First, the fuels organization does not provide the fuels officer sufficient control to operate efficiently. Liquid Fuels Maintenance, Refueling Maintenance, and Cryogenics experts should be under the fuels officer's control. This increased control would improve the in-service rate of equipment and enhance the servicing capability of the fuels operations.

Second, if Fuels were made a separate organization, communication could improve between fuels and the DCR, DCM, and the Wing Commander. In addition, better service could be provided by outside support agencies, increasing the efficiency and capability of the fuels operation. The separate fuels organization should be placed under the DCR to be most effective.

Recommendations. The fuels organization should be removed from the Supply Squadron and made a separate organization subordinate to the Deputy Commander for Resource Management (DCR). The support agencies which are dedicated to the maintenance of fuels facilities and equipment (Liquid Fuels Maintenance, Refueling Maintenance, and Cryogenics) should be placed in the fuels organization under the fuels officer's control. Safety incidents would decrease because of better control over maintenance resulting in improved efficiency.

Two organizational solutions are possible for the independent fuels organization. First, with the support agencies part of the fuels organization, most fuels branches would be large enough to organize a squadron, again subordinate to the DCR. This organization would allow for much better career progression for the "pure" fuels officer. Each large squadron would have several fuels officers assigned: the squadron commander, an operations officer and perhaps an officer in distribution or storage. The junior

officers would gain experience under the direction of more experienced officers and then have the opportunity to move up into positions of more responsibility. Promotion opportunities would be enhanced because the fuels officer could be assigned to a commander's slot in his career field. This organizational change would increase communications with the senior level officers on the base and could provide improved fuels support.

The second organizational option is to designate each fuels organization as a separate division subordinate to the DCR. The fuels division would be assigned to the Headquarters Squadron for administrative support but would report to the DCR and continue to receive guidance from MAJCOM personnel.

The fuels squadron option has some negative aspects. First, it would require more fuels officers with higher rank. Second, it will add a First Sergeant and squadron administrative personnel to operate the squadron. Thus, the second option may be more feasible to implement considering tight budgets and shortages of fuels officers.

#### Research Question 4

Conclusions. Statistically, no clear cut conclusion can be made as to whether the consolidation has improved career progression. Answers to question 13 show 60 respondents disagreed and 44 agreed while 41 (or more than 20%) neither agreed nor disagreed. It appears that fuels offi-

cers as a group do not agree that the consolidation has improved their career proression. However, the officers with more fuels experience, higher rank, only fuels experience, and those in fuels staff positions all answered significantly lower than the opposite groups, which indicates that these fuels officers did not see any benefit from the consolidation of AFSCs.

Fuels officers were also very content to be in fuels, and desired to stay in fuels if it were made an independent organization.

Recommendation. Since no definite conclusion can be made as to the positive effect of the AFSC consolidation on career progression, the fuels officer should be broken out of supply and be awarded a separate AFSC. This would allow fuels officers to remain in the fuels career field and manage their career progression as fuels officers.

#### Future Research

Senior Enlisted Fuels Personnel. This same survey could be sent, with some modifications, to the senior enlisted fuels personnel to get their feedback on the effect of the AFSC consolidation and the changes in organizational structure. The enlisted force deals directly with the operations of the fuels organization and may provide some strong insight into improved efficiency in the fuels operation.

Chief of Supply and DCR. Chiefs of Supply and DCRs also have insight into the operation of the fuels operation. They approach fuels from a management point of view and may give information not addressed in this study that would influence the implementation of the recommendations in this report.

Statistical Analysis. The data used in this study could be analyzed from an interval level (this report assumed ordinal) using parametric tests to test for significance. The parametric results could then be compared with the nonparametric results of this study to see if there are differences.

Time Factor. Because of the relatively short amount of time since the consolidation of fuels and supply officer AFSCs, another study should be performed in five years to construct a more distinct picture on the effects of the consolidation.

### Summary

The overall consensus of 145 supply officers with fuels experience was that fuels is a unique career field and should be awarded a separate AFSC. They also generally agreed that the fuels operation would be more efficient and provide better service if it became a separate organization subordinate to the Deputy Commander for Resources and included the support agencies dedicated solely to the mainte-



nance of fuels equipment and facilities. With an ever increasing emphasis on fuels and its management, these recommended changes should be implemented to improve the efficient management of petroleum resources.



DEPARTMENT OF THE AIR FORCE  
AIR FORCE INSTITUTE OF TECHNOLOGY (AU)  
WRIGHT-PATTERSON AIR FORCE BASE, OH 45433

Appendix A: Survey Instrument

REPLY TO  
ATTN OF: LS

SUBJECT: Reorganization of Base Fuels and Fuels Officer AFSC

TO: USAF Fuels Officers

1. HQ USAF is actively examining the possibility of reorganizing the base fuels organization and creating a unique AFSC for fuels officers. The Air Force Institute of Technology is gathering data as part of a research project that may influence the existing fuels organization.
2. Please take the time to provide the information requested. Your responses will be combined with responses from other fuels officers to analyze the feasibility of a reorganization. Please return the information in the enclosed addressed envelope by 15 May 1985.
3. Your responses will be kept anonymous and will not be attributed to you personally.
4. If you have any questions, please contact Capt Spackman, (AV 785-6569). Your participation is completely voluntary, but we would certainly appreciate your help in gathering this data.

*Larry L. Smith*  
LARRY L. SMITH, Colonel, USAF  
Dean  
School of Systems and Logistics

- 2 Atch  
1. Questionnaire  
2. Return Envelope

USAF SCN 85-23

## FUELS OFFICER'S OPINIONS ON ORGANIZATIONAL CHANGES

USAF Survey Control Number 85-23

### Introduction

Base fuels is a diverse organization, usually operating 24 hours a day. The fuels officer is responsible for the receipt, storage, and issue of petroleum products and cryogenics, accurate accounting for these products, quality control, and safety. In 1979, the fuels officer AFSC (63XX) was consolidated with the supply officer AFSC (64XX). The information requested will be used to determine the effect of this consolidation and to determine if a different organizational structure could improve the fuels operations.

### Instructions

This survey is being sent to all supply officers who are currently filling fuels positions and to those supply officers who have had fuels experience in the past.

This questionnaire is divided into four parts. Please answer each question using the directions provided. If you have comments about any of the questions please include them on the last page. We would appreciate any comments you may have. Please do NOT write your name on this questionnaire so your responses will remain anonymous.

### Part One: Technical

This section will be used to determine if the fuels officer position warrants a separate AFSC, and the effect of a unique fuels officer AFSC on the efficiency of the fuels organization.

Circle the number that most correctly represents your opinion.

strongly			neither				
disagree	disagree	disagree	agree nor	disagree	agree	agree	strongly
1	2	3	4	5	6	7	

1. Fuels operations have become less efficient by consolidating the fuels officer AFSC with the supply officer AFSC.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

strongly disagree	disagree	slightly disagree	neither agree nor disagree	slightly agree	agree	strongly agree
1	2	3	4	5	6	7

2. The result of the consolidation of the fuels officer AFSC and the supply officer AFSC could be:

a. Increased fuel safety incidents

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. Higher fuel service rate

1	2	3	4	5	6	7
---	---	---	---	---	---	---

c. More fuel accounting errors

1	2	3	4	5	6	7
---	---	---	---	---	---	---

d. Improved fuels quality control program

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3. I feel that the fuels operations will benefit by having experienced fuels officers with a unique AFSC.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

4. The benefits of having experienced fuels officers with a unique AFSC could include:

a. Better fuel safety records

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. Weaker quality control record

1	2	3	4	5	6	7
---	---	---	---	---	---	---

c. Lower fuel service rate

1	2	3	4	5	6	7
---	---	---	---	---	---	---

d. More accurate fuels accounting

1	2	3	4	5	6	7
---	---	---	---	---	---	---

strongly disagree	disagree	slightly disagree	neither agree nor disagree	slightly agree	agree	strongly agree
1	2	3	4	5	6	7

5. I feel the technical skills required of a fuels officer justify having a unique AFSC.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

## Part Two: Organization

Your responses to this section will help us determine if a different organizational structure could improve the efficiency of the fuels operation.

6. The in-service rate of fixed equipment (hydrants, storage tanks, fill stands, etc) would improve if Liquid Fuels Maintenance (LFM) were part of the fuels branch.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

7. Fewer safety violations would occur due to maintenance if LFM were part of the fuels organization.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

8. Increased cryogenic service could be provided if experts were assigned to the fuels branch to maintain the cryogenic equipment.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

9. If the base fuels organization became an independent division on the same level as supply and transportation squadrons, communications would improve between base fuels and the:

a. Deputy Commander for Resource Management (DCR, RM)

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. Deputy Commander for Maintenance (DCM)

1	2	3	4	5	6	7
---	---	---	---	---	---	---

c. Wing Commander

1	2	3	4	5	6	7
---	---	---	---	---	---	---

strongly			neither			
disagree	disagree	slightly	agree nor	slightly	agree	strongly
1	2	disagree	disagree	agree	6	agree
		3	4	5		7

10. Suppose that refueling maintenance, LFM, and the cryogenics section were not added to the fuels branch, but the fuels branch itself became a separate division, directly subordinate to the RM.

In this situation, the service provided to the fuels organization by the following agencies could still improve:

a. Refueling Maintenance

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. Liquid Fuels Maintenance

1	2	3	4	5	6	7
---	---	---	---	---	---	---

c. Cryogenics section

1	2	3	4	5	6	7
---	---	---	---	---	---	---

11. I would like to see the base fuels branch as a separate organization, instead of a branch within the supply squadron.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

12. If I had my choice, I would make fuels subordinate to:

a. Chief of Supply (no change)

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. Deputy Commander for Resource Management (on the same level as the Chief of Supply)

1	2	3	4	5	6	7
---	---	---	---	---	---	---

c. Deputy Commander for Maintenance

1	2	3	4	5	6	7
---	---	---	---	---	---	---

d. other (explain)

strongly			neither			
disagree	disagree	slightly	agree nor	slightly	agree	strongly
1	2	3	4	5	6	7
		disagree	disagree	agree	agree	agree

Part Three: Career Progression

This section will be used to determine if the fuels officer's promotion opportunity and career have been enhanced by having a supply officer AFSC.

13. My career progression has been enhanced by having the fuels officer AFSC combined with the supply officer AFSC (6421/24).

1	2	3	4	5	6	7
---	---	---	---	---	---	---

14. I wanted to be assigned as a fuels officer prior to my current assignment.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

15. Having fuels officer experience has been a benefit to my:

a. career progression

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. total military experience

1	2	3	4	5	6	7
---	---	---	---	---	---	---

16. If the fuels branch were taken out of supply and made a separate organization, I would choose to stay in the fuels career field.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

#### Part Four: Background and History

The purpose of this section is to collect historical data and determine to what extent fuels officers have been integrated into the supply career field.

17. What is your rank?

- a. 2lt
- b. 1lt
- c. Capt
- d. Maj
- e. LtCol
- f. Col

18. What organizational level are you assigned to?

- a. Squadron
- b. Air Division
- c. Numbered Air Force
- d. Major Command
- e. other (specify) \_\_\_\_\_

19. What Major Command are you assigned to?

- |          |                          |
|----------|--------------------------|
| a. SAC   | g. AAC                   |
| b. MAC   | h. AFLC                  |
| c. TAC   | i. AFSC                  |
| d. USAFE | j. SPC                   |
| e. PACAF | k. other (specify) _____ |
| f. ATC   |                          |

20. What Major Commands have you been assigned to in the past? (Circle as many as apply)

- |          |                          |
|----------|--------------------------|
| a. SAC   | g. AAC                   |
| b. MAC   | h. AFLC                  |
| c. TAC   | i. AFSC                  |
| d. USAFE | j. SPC                   |
| e. PACAF | k. other (specify) _____ |
| f. ATC   |                          |

21. Are you currently assigned to a fuels position?

- a. yes
- b. no



21. How long have you been a fuels officer?

- a. less than 1 year
- b. 1 year but less than 2 years
- c. 2 years but less than 3 years
- d. 3 years but less than 4 years
- e. 4 years or more If so, how long? \_\_\_\_\_

22. Have you been assigned in a fuels position, then in a supply position, and then back into a fuels position?

- a. yes if so, how long were you in a supply position? \_\_\_\_\_
- b. no \_\_\_\_\_

23. Have you attended the fuels officer technical training school at Chanute AFB?

- a. yes if so, when? \_\_\_\_\_
- b. no (mo/yr)

24. Have you attended the supply operations officer school (6421/24) at Lowry AFB?

- a. yes if so, when? \_\_\_\_\_
- b. no (mo/yr)

25. Have you worked in any other part of base supply?

- a. no
- b. yes if so, which branch?
  - 1) management and procedures
  - 2) customer support
  - 3) materiel management
  - 4) systems
  - 5) storage and distribution
  - 6) other (please specify) \_\_\_\_\_

26. How many fuels personnel are assigned to your branch?

- a. none (I am currently in a supply position)
- b. none (I am currently in a fuels staff position)
- c. less than 30
- d. 30 or more but less than 50
- e. 50 or more but less than 70
- f. 70 or more

Thank you for your time and participation in this study. Please include your comments on the following page. If you need more space please use a blank sheet of paper. Thank you again.

YOUR COMMENTS:

Appendix B: Survey Raw Data

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5.61232552346656565444625655556ee(ALC)h(abc)ae(11)aa  
bb(6COS)b  
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e(21)babb(6SQ section)b  
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9.663517623676766666716727777fe(HQUSAF)k(HQUSAF)(aceh)a  
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b(HQMac LGSWS Div Chief)f  
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31.6643166143665775677715447667de(DOD)k(DLA)(bdeh)ae(14)aaa  
b(6COS)b  
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k(DLA)(abde)ae(18)babab  
33.7335377117776666633375673-667ce(Base/Wing)d(cik)ae(9)baa  
b(6)f  
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 babaf  
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 b(SMO, EMO)a  
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 baa b(235)b

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 131.76261771677777777771-647777daa(adei)be(14)babb(15)a  
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 145.76221774177777777666716727777baaaabbaab(3)f

# Appendix C: Frequencies Program Results

QUEST 1 FUELS OPERATIONS HAVE BECOME LESS EFFICIENT BY  
CONSOLIDATING AFSCS.

CODE

```

I
1 ***** (10)
I   STRONGLY DISAGREE
I
2 ***** (12)
I   DISAGREE
I
3 ***** (5)
I   SLIGHTLY DISAGREE
I
4 ***** (19)
I   NEITHER AGREE NOR DISAGREE
I
5 ***** (17)
I   SLIGHTLY AGREE
I
6 ***** (36)
I   AGREE
I
7 ***** (44)
I   STRONGLY AGREE
I
I.....I.....I.....I.....I.....I
0          10          20          30          40          50
FREQUENCY

```

MEDIAN 5.736

VALID CASES 143 MISSING CASES 2

QUEST 2A RESULTS OF THE AFSC CONSOLIDATION COULD BE INCREASED  
FUEL SAFETY INCIDENTS.

CODE

	I	
1	***** (8)	
	I STRONGLY DISAGREE	
	I	
2	***** (29)	
	I DISAGREE	
	I	
3	***** (5)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (27)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (28)	
	I SLIGHTLY AGREE	
	I	
6	***** (33)	
	I AGREE	
	I	
7	***** (15)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I	
	0 10 20 30 40 50	
	FREQUENCY	

MEDIAN 4.625

VALID CASES 145 MISSING CASES 0



QUEST 2B RESULTS OF THE AFSC CONSOLIDATION COULD BE HIGHER  
FUEL SERVICE RATES.

CODE

1	I	***** (18)
	I	STRONGLY DISAGREE
2	I	***** (40)
	I	DISAGREE
3	I	***** (18)
	I	SLIGHTLY DISAGREE
4	I	***** (46)
	I	NEITHER AGREE NOR DISAGREE
5	I	***** (8)
	I	SLIGHTLY AGREE
6	I	***** (10)
	I	AGREE
7	I	*** (2)
	I	STRONGLY AGREE
	I	
	I	I.....I.....I.....I.....I.....I
		0          10          20          30          40          50
		FREQUENCY

MEDIAN 3.222

VALID CASES 142 MISSING CASES 3

QUEST 2C RESULTS OF THE AFSC CONSOLIDATION COULD BE MORE FUEL  
ACCOUNTING ERRORS.

CODE

```

I
1 ***** (9)
I   STRONGLY DISAGREE
I
2 ***** (23)
I   DISAGREE
I
3 ***** (9)
I   SLIGHTLY DISAGREE
I
4 ***** (31)
I   NEITHER AGREE NOR DISAGREE
I
5 ***** (18)
I   SLIGHTLY AGREE
I
6 ***** (33)
I   AGREE
I
7 ***** (22)
I   STRONGLY AGREE
I
I.....I.....I.....I.....I.....I
0          10          20          30          40          50
FREQUENCY

```

MEDIAN            4.528

VALID CASES        145        MISSING CASES        0

QUEST 2D RESULTS OF THE AFSC CONSOLIDATION COULD BE IMPROVED  
FUELS QUALITY CONTROL PROGRAM.

CODE	
	I
1	***** (31)
	I STRONGLY DISAGREE
	I
2	***** (56)
	I DISAGREE
	I
3	***** (19)
	I SLIGHTLY DISAGREE
	I
4	***** (22)
	I NEITHER AGREE NOR DISAGREE
	I
5	***** (7)
	I SLIGHTLY AGREE
	I
6	***** (7)
	I AGREE
	I
7	*** (3)
	I STRONGLY AGREE
	I
	I.....I.....I.....I.....I.....I.....I
	0          20          40          60          80          100
	FREQUENCY
MEDIAN	2.241
VALID CASES	145
MISSING CASES	0

QUEST 3    FUELS OPERATIONS WILL BENEFIT BY HAVING EXPERIENCED  
FUELS OFFICERS WITH A UNIQUE AFSC.

CODE

	I	
1	***** (7)	
	I    STRONGLY   DISAGREE	
	I	
2	**** (6)	
	I    DISAGREE	
	I	
3	** (2)	
	I    SLIGHTLY DISAGREE	
	I	
4	***** (8)	
	I    NEITHER AGREE NOR DISAGREE	
	I	
5	***** (13)	
	I    SLIGHTLY AGREE	
	I	
6	***** (33)	
	I    AGREE	
	I	
7	***** (73)	
	I    STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I.....I	
	0                      20                      40                      60                      80                      100	
	FREQUENCY	

MEDIAN            6.527

VALID CASES            142            MISSING CASES            3

QUEST 4A BENEFITS OF A UNIQUE FUELS OFFICER AFSC COULD  
INCLUDE BETTER FUEL SAFETY RECORDS.

CODE

	I	
1	***** (4)	
	I STRONGLY DISAGREE	
	I	
2	***** (9)	
	I DISAGREE	
	I	
3	***** (4)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (14)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (32)	
	I SLIGHTLY AGREE	
	I	
6	***** (44)	
	I AGREE	
	I	
7	***** (38)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I.....I	
	0          10          20          30          40          50	
	FREQUENCY	

MEDIAN 5.716

VALID CASES 145 MISSING CASES 0

QUEST 4B BENEFITS OF A UNIQUE FUELS OFFICER AFSC COULD  
INCLUDE A WEAKER QUALITY CONTROL RECORD.

CODE

1	I	***** (70)
	I	STRONGLY DISAGREE
2	I	***** (22)
	I	DISAGREE
3	I	***** (8)
	I	SLIGHTLY DISAGREE
4	I	***** (17)
	I	NEITHER AGREE NOR DISAGREE
5	I	* (0)
	I	SLIGHTLY AGREE
6	I	*** (4)
	I	AGREE
7	I	** (2)
	I	STRONGLY AGREE
	I	I.....I.....I.....I.....I.....I.....I
		0          20          40          60          80          100
		FREQUENCY

MEDIAN 1.547

VALID CASES 144 MISSING CASES 1

QUEST 4C BENEFITS OF A UNIQUE FUELS OFFICER AFSC COULD  
INCLUDE A LOWER FUEL SERVICING RATE.

CODE

1	***** (44)								
	I STRONGLY DISAGREE								
2	***** (32)								
	I DISAGREE								
3	***** (13)								
	I SLIGHTLY DISAGREE								
4	***** (30)								
	I NEITHER AGREE NOR DISAGREE								
5	***** (4)								
	I SLIGHTLY AGREE								
6	***** (15)								
	I AGREE								
7	***** (3)								
	I STRONGLY AGREE								
	I.....I.....I.....I.....I.....I.....I								
	0          10          20          30          40          50								
	FREQUENCY								

MEDIAN 2.328

VALID CASES 141 MISSING CASES 4

QUEST 4D BENEFITS OF A UNIQUE FUELS OFFICER AFSC COULD  
INCLUDE MORE ACCURATE FUELS ACCOUNTING.

CODE

	I	
1	***** (4)	
	I STRONGLY DISAGREE	
	I	
2	***** (8)	
	I DISAGREE	
	I	
3	***** (7)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (17)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (27)	
	I SLIGHTLY AGREE	
	I	
6	***** (41)	
	I AGREE	
	I	
7	***** (41)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I.....I	
	0          10          20          30          40          50	
	FREQUENCY	

MEDIAN 5.732

VALID CASES 145 MISSING CASES 0



QUEST 5 TECHNICAL SKILLS JUSTIFY A UNIQUE FUELS AFSC.

CODE

I									
1	***	(4)							
I	STRONGLY	DISAGREE							
I									
2	*****	(9)							
I	DISAGREE								
I									
3	****	(6)							
I	SLIGHTLY	DISAGREE							
I									
4	**	(1)							
I	NEITHER	AGREE NOR DISAGREE							
I									
5	*****	(18)							
I	SLIGHTLY	AGREE							
I									
6	*****	(18)							
I	AGREE								
I									
7	*****	(71)							
I	STRONGLY	AGREE							
I									
I	.....I.....I.....I.....I.....I.....I.....I								
0		20	40	60	80	100			
FREQUENCY									

MEDIAN 6.458

VALID CASES 145 MISSING CASES 0

QUEST 6 IN-SERVICE RATE FOR FIXED EQUIPMENT WOULD IMPROVE  
IF LFM WERE PART OF FUELS.

CODE	
	I
1	*** (3)
	I STRONGLY DISAGREE
	I
2	*** (4)
	I DISAGREE
	I
3	** (2)
	I SLIGHTLY DISAGREE
	I
4	** (2)
	I NEITHER AGREE NOR DISAGREE
	I
5	***** (16)
	I SLIGHTLY AGREE
	I
6	***** (44)
	I AGREE
	I
7	***** (74)
	I STRONGLY AGREE
	I
	I.....I.....I.....I.....I.....I.....I
	0          20          40          60          80          100
	FREQUENCY

MEDIAN           6.520

VALID CASES       145       MISSING CASES    0

QUEST 7 FEWER SAFETY VIOLATIONS WOULD OCCUR IF LFM WERE  
PART OF FUELS.

CODE

1	** (2)	
	I STRONGLY DISAGREE	
2	*** (3)	
	I DISAGREE	
3	**** (6)	
	I SLIGHTLY DISAGREE	
4	***** (12)	
	I NEITHER AGREE NOR DISAGREE	
5	***** (32)	
	I SLIGHTLY AGREE	
6	***** (29)	
	I AGREE	
7	***** (61)	
	I STRONGLY AGREE	
	I.....I.....I.....I.....I.....I	
	0          20          40          60          80          100	
	FREQUENCY	

MEDIAN 6.103

VALID CASES 145 MISSING CASES 0

QUEST 8 CRYOGENIC SERVICE COULD INCREASE IF CRYOGENICS  
EXPERTS WERE ASSIGNED TO FUELS.

CODE

1	** (2)	I	STRONGLY	DISAGREE
2	*** (4)	I	DISAGREE	
3	** (1)	I	SLIGHTLY	DISAGREE
4	***** (8)	I	NEITHER	AGREE NOR DISAGREE
5	***** (16)	I	SLIGHTLY	AGREE
6	***** (45)	I	AGREE	
7	***** (69)	I	STRONGLY	AGREE
		I		
		I.....I.....I.....I.....I.....I		
		0          20          40          60          80          100		
		FREQUENCY		

MEDIAN 6.422

V LID CASES 145 MISSING CASES 0

QUEST 9A IF BASE FUELS BECAME A SEPARATE ORGANIZATION,  
COMMUNICATIONS WOULD IMPROVE WITH THE DCR.

CODE

	I	
1	*** (3)	
	I STRONGLY DISAGREE	
	I	
2	**** (6)	
	I DISAGREE	
	I	
3	*** (4)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (10)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (16)	
	I SLIGHTLY AGREE	
	I	
6	***** (39)	
	I AGREE	
	I	
7	***** (67)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I	
	0          20          40          60          80          100	
	FREQUENCY	

MEDIAN           6.359

VALID CASES       145       MISSING CASES    0

QUEST 9B IF BASE FUELS BECAME A SEPARATE ORGANIZATION,  
COMMUNICATIONS WOULD IMPROVE WITH THE DCM.

**CODE**

1 I  
\*\*\* (3)  
I STRONGLY DISAGREE

2 \*\*\*\* (5)  
I DISAGREE

3 \*\*\*\* (6)  
I SLIGHTLY DISAGREE

4 \*\*\*\*\* (12)  
I NEITHER AGREE NOR DISAGREE

5 \*\*\*\*\* (18)  
I SLIGHTLY AGREE

6 \*\*\*\*\* (39)  
I AGREE

7 \*\*\*\*\* (61)  
I STRONGLY AGREE

A horizontal dotted line with tick marks and labels 0, 20, 40, 60, 80, and 100.

## FREQUENCY

**MEDIAN**            **6.218**

VALID CASES	144	MISSING CASES	1
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QUEST 9C IF BASE FUELS BECAME A SEPARATE ORGANIZATION  
COMMUNICATIONS WOULD IMPROVE WITH THE WING  
COMMANDER.

CODE

	I	
1	*** (3)	
	I STRONGLY DISAGREE	
	I	
2	***** (8)	
	I DISAGREE	
	I	
3	**** (5)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (11)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (17)	
	I SLIGHTLY AGREE	
	I	
6	***** (43)	
	I AGREE	
	I	
7	***** (57)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I.....I	
	0          20          40          60          80          100	
	FREQUENCY	

MEDIAN           6.151

VALID CASES       144       MISSING CASES    1

QUEST 10A FUELS SEPARATE ORGANIZATION--LFM, REFUELING  
 MAINTENANCE, CRYOGENICS STAY AS IS--COULD  
 SERVICE IMPROVE FROM REFUELING MAINTENANCE?

CODE

	I	
1	***** (7)	
	I STRONGLY DISAGREE	
	I	
2	***** (17)	
	I DISAGREE	
	I	
3	***** (14)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (13)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (30)	
	I SLIGHTLY AGREE	
	I	
6	***** (46)	
	I AGREE	
	I	
7	***** (18)	
	I STRONGLY AGREE	
	I	
	I.. ..I.. ..I.. ..I.. ..I.. ..I.. ..I	
	0 10 20 30 40 50	
	FREQUENCY	

MEDIAN 5.217

VALID CASES 145 MISSING CASES 0



QUEST 10B FUELS SEPARATE ORGANIZATION--LFM, REFUELING  
 MAINTENANCE, AND CRYOGENICS STAY AS IS--COULD  
 SERVICE FROM LFM IMPROVE?

CODE

I	
1	***** (7)
I	STRONGLY DISAGREE
I	
2	***** (19)
I	DISAGREE
I	
3	***** (15)
I	SLIGHTLY DISAGREE
I	
4	***** (18)
I	NEITHER AGREE NOR DISAGREE
I	
5	***** (27)
I	SLIGHTLY AGREE
I	
6	***** (43)
I	AGREE
I	
7	***** (16)
I	STRONGLY AGREE
I	
I	I.....I.....I.....I.....I.....I
0	10 20 30 40 50
FREQUENCY	

MEDIAN 5.000

VALID CASES 145 MISSING CASES 0

QUEST 10C FUELS SEPARATE ORGANIZATION--LFM, REFUELING  
 MAINTENANCE, AND CRYOGENICS STAY AS IS--COULD  
 SERVICE IMPROVE FROM CROGENICS EXPERTS?

CODE

I					
1	***** (8)				
I	STRONGLY DISAGREE				
I					
2	***** (20)				
I	DISAGREE				
I					
3	***** (15)				
I	SLIGHTLY DISAGREE				
I					
4	***** (20)				
I	NEITHER AGREE NOR DISAGREE				
I					
5	***** (30)				
I	SLIGHTLY AGREE				
I					
6	***** (38)				
I	AGREE				
I					
7	***** (14)				
I	STRONGLY AGREE				
I					
I	.....I.....I.....I.....I.....I				
0	10 20 30 40 50				
FREQUENCY					

MEDIAN 4.817

VALID CASES 145 MISSING CASES 0

AD-A161 706

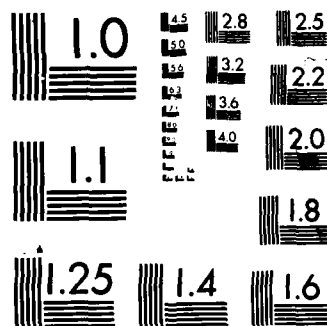
FUELS BRANCH REORGANIZATION: A STUDY OF THE FUELS  
OFFICER AND THE FUELS O (U) AIR FORCE INST OF TECH  
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST L C SPACKMAN  
SEP 85 AFIT/GLM/LSM/855-72 F/G 5/9

2/2

UNCLASSIFIED

NL

										END		
										FILED		
										ONE		



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963-A

QUEST 11 PREFER TO SEE BASE FUELS AS A SEPARATE ORGANIZATION.

CODE

	I	
1	***** (9)	
	I STRONGLY DISAGREE	
	I	
2	***** (13)	
	I DISAGREE	
	I	
3	*** (3)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (7)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (10)	
	I SLIGHTLY AGREE	
	I	
6	***** (25)	
	I AGREE	
	I	
7	***** (75)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I	
	0 20 40 60 80 100	
	FREQUENCY	

MEDIAN 6.553

VALID CASES 142 MISSING CASES 3

QUEST 12A IF I HAD MY CHOICE, I WOULD MAKE FUELS  
SUBORDINATE TO THE CHIEF OF SUPPLY (NO CHANGE).

CODE

	I	
1	***** (51)	
	I STRONGLY DISAGREE	
	I	
2	***** (31)	
	I DISAGREE	
	I	
3	**** (6)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (21)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	**** (6)	
	I SLIGHTLY AGREE	
	I	
6	***** (15)	
	I AGREE	
	I	
7	***** (8)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I.....I	
	0          20          40          60          80          100	
	FREQUENCY	

MEDIAN 2.081

VALID CASES 138 MISSING CASES 7

QUEST 12B IF I HAD MY CHOICE, I WOULD MAKE FUELS  
SUBORDINATE TO THE DCR.

CODE

```

I
1 ***** (10)
  I   STRONGLY DISAGREE
  I
2 ***** (16)
  I   DISAGREE
  I
3 ***** (8)
  I   SLIGHTLY DISAGREE
  I
4 ***** (9)
  I   NEITHER AGREE NOR DISAGREE
  I
5 ***** (20)
  I   SLIGHTLY AGREE
  I
6 ***** (34)
  I   AGREE
  I
7 ***** (45)
  I   STRONGLY AGREE
  I
I.....I.....I.....I.....I.....I
0          10          20          30          40          50
FREQUENCY

```

MEDIAN 5.735

VALID CASES 142 MISSING CASES 3

QUEST 12C IF I HAD MY CHOICE, I WOULD MAKE FUELS  
SUBORDINATE TO THE DCM.

CODE

	I	
1	***** (43)	
	I STRONGLY DISAGREE	
	I	
2	***** (22)	
	I DISAGREE	
	I	
3	***** (11)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (11)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (12)	
	I SLIGHTLY AGREE	
	I	
6	***** (15)	
	I AGREE	
	I	
7	***** (25)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I	
	0          10          20          30          40          50	
	FREQUENCY	

MEDIAN 2.909

VALID CASES 139 MISSING CASES 6



QUEST 13 CAREER PROGRESSION HAS BEEN ENHANCED BECAUSE OF  
AFSC CONSOLIDATION.

CODE

I					
1	***** (24)				
I	STRONGLY DISAGREE				
I					
2	***** (27)				
I	DISAGREE				
I					
3	***** (9)				
I	SLIGHTLY DISAGREE				
I					
4	***** (41)				
I	NEITHER AGREE NOR DISAGREE				
I					
5	***** (10)				
I	SLIGHTLY AGREE				
I					
6	***** (19)				
I	AGREE				
I					
7	***** (15)				
I	STRONGLY AGREE				
I					
I	.....I.....I.....I.....I.....I.....I				
0	10	20	30	40	50
FREQUENCY					

MEDIAN 3.805

VALID CASES 145 MISSING CASES 0

QUEST 14 WANTED TO BE ASSIGNED AS A FUELS OFFICER PRIOR  
TO CURRENT ASSIGNMENT.

CODE

	I	
1	***** (5)	
	I STRONGLY DISAGREE	
	I	
2	***** (18)	
	I DISAGREE	
	I	
3	**** (3)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (20)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	***** (6)	
	I SLIGHTLY AGREE	
	I	
6	***** (39)	
	I AGREE	
	I	
7	***** (49)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I	
	0 10 20 30 40 50	
	FREQUENCY	

MEDIAN 5.962

VALID CASES 140 MISSING CASES 5

QUEST 15A FUELS EXPERIENCE HAS BEEN A BENEFIT TO MY CAREER  
PROGRESSION.

CODE

I  
1 \*\*\* (4)  
I STRONGLY DISAGREE  
I  
2 \*\*\*\*\* (7)  
I DISAGREE  
I  
3 \*\*\*\* (6)  
I SLIGHTLY DISAGREE  
I  
4 \*\*\*\*\* (19)  
I NEITHER AGREE NOR DISAGREE  
I  
5 \*\*\*\*\* (8)  
I SLIGHTLY AGREE  
I  
6 \*\*\*\*\* (54)  
I AGREE  
I  
7 \*\*\*\*\* (46)  
I STRONGLY AGREE  
I

I.....I.....I.....I.....I.....I.....I  
0 20 40 60 80 100  
FREQUENCY

MEDIAN 6.019

VALID CASES 144 MISSING CASES 1

QUEST 15B FUELS EXPERIENCE HAS BEEN A BENEFIT TO MY TOTAL  
MILITARY EXPERIENCE.

CODE

	I	
1	** (2)	
	I	STRONGLY DISAGREE
	I	
2	**** (6)	
	I	DISAGREE
	I	
3	** (1)	
	I	SLIGHTLY DISAGREE
	I	
4	**** (5)	
	I	NEITHER AGREE NOR DISAGREE
	I	
5	***** (10)	
	I	SLIGHTLY AGREE
	I	
6	***** (58)	
	I	AGREE
	I	
7	***** (63)	
	I	STRONGLY AGREE
	I	
	I.....I.....I.....I.....I.....I.....I	
	0          20          40          60          80          100	
	FREQUENCY	

MEDIAN        6.336

VALID CASES        145        MISSING CASES        0

QUEST 16 IF FUELS WERE MADE A SEPARATE ORGANIZATION, I  
WOULD STAY IN FUELS.

CODE

	I	
1	***** (9)	
	I STRONGLY DISAGREE	
	I	
2	***** (7)	
	I DISAGREE	
	I	
3	*** (4)	
	I SLIGHTLY DISAGREE	
	I	
4	***** (13)	
	I NEITHER AGREE NOR DISAGREE	
	I	
5	**** (6)	
	I SLIGHTLY AGREE	
	I	
6	***** (31)	
	I AGREE	
	I	
7	***** (75)	
	I STRONGLY AGREE	
	I	
	I.....I.....I.....I.....I.....I	
	0          20          40          60          80          100	
	FREQUENCY	

MEDIAN 6.533

VALID CASES 145 MISSING CASES 0

# QUEST 17 RANK OF RESPONDENTS

```

CODE
  I
1  ***** (9)
  I  2LT
  I
2  ***** (14)
  I  1LT
  I
3  ***** (77)
  I  CAPT
  I
4  ***** (13)
  I  MAJ
  I
5  ***** (16)
  I  LT COL
  I
6  *** (3)
  I  COL
  I
  I.....I.....I.....I.....I.....I
  0          20          40          60          80          100
FREQUENCY

MEAN   3.241   MEDIAN  3.143   MODE    3.000

VALID CASES   145   MISSING CASES   0

```

QUEST 18 ORGANIZATIONAL LEVEL ASSIGNED

CODE

I  
1 \*\*\*\*\* (82)

I SQUADRON

I  
2 \* (0)

I AIR DIVISION

I  
3 \*\*\*\* (6)

I NUMBERED AIR FORCE

I  
4 \*\*\*\*\* (21)

I MAJOR COMMAND

I  
5 \*\*\*\*\* (36)

I OTHER

I  
I.....I.....I.....I.....I.....I.....I  
0 20 40 60 80 100

FREQUENCY

MEAN 2.510 MEDIAN 1.384 MODE 1.000

VALID CASES 145 MISSING CASES 0

# QUEST 19 MAJOR COMMAND ASSIGNED

```

CODE
  I
1  ***** (23)
  I  SAC
  I
2  ***** (13)
  I  MAC
  I
3  ***** (21)
  I  TAC
  I
4  ***** (28)
  I  USAFE
  I
5  ***** (11)
  I  PACAF
  I
6  ***** (5)
  I  ATC
  I
7  ***** (5)
  I  AAC
  I
8  ***** (9)
  I  AFLC
  I
9  *** (2)
  I  AFSC
  I
10 ** (1)
  I  SPC
  I
11 ***** (27)
  I  OTHER
  I
  I.....I.....I.....I.....I.....I
  0          10          20          30          40          50
FREQUENCY

```

MEAN 5.110 MEDIAN 4.054 MODE 4.000

VALID CASES 145 MISSING CASES 0



QUEST 19 MAJOR COMMAND ASSIGNED TO IN THE PAST

```

CODE
  I
1 ***** (81)
  I SAC
  I
2 ***** (46)
  I MAC
  I
3 ***** (57)
  I TAC
  I
4 ***** (55)
  I USAFE
  I
5 ***** (68)
  I PACAF
  I
6 ***** (53)
  I ATC
  I
7 ***** (18)
  I AAC
  I
8 ***** (17)
  I AFLC
  I
9 ***** (8)
  I AFSC
  I
10 ** (2)
  I SPC
  I
11 ***** (27)
  I OTHER
  I
  I.....I.....I.....I.....I.....I
  0          20          40          60          80          100
FREQUENCY

MEAN  4.208  MEDIAN  4.582  MODE  1.000

VALID CASES 432  MISSING CASES  0

```

QUEST 21 CURRENTLY ASSIGNED TO A FUELS POSITION

CODE

I  
1 \*\*\*\*\* (104)

I YES

I  
2 \*\*\*\*\* (41)

I NO

I  
I.....I.....I.....I.....I.....I.....I  
0 40 80 120 160 200

FREQUENCY

MEAN 1.283 MEDIAN 1.197 MODE 1.000

VALID CASES 145 MISSING CASES 0

QUEST 21 HOW LONG HAVE YOU BEEN A FUELS OFFICER?

CODE

I  
1 \*\*\*\*\* (7)  
I LESS THAN 1 YEAR

I  
2 \*\*\*\*\* (20)  
I 1 YEAR BUT LESS THAN 2 YEARS

I  
3 \*\*\*\*\* (13)  
I 2 YEARS BUT LESS THAN 3 YEARS

I  
4 \*\*\*\*\* (14)  
I 3 YEARS BUT LESS THAN 4 YEARS

I  
5 \*\*\*\*\* (91)  
I 4 YEARS OR MORE

I  
I.....I.....I.....I.....I.....I.....I  
0 20 40 60 80 100

FREQUENCY

MEAN 4.117 MODE 4.703 MODE 5.000

VALID CASES 145 MISSING CASES 0

QUEST 22 ASSIGNED TO FUELS, THEN SUPPLY, THEN FUELS

CODE

```

I
1 ***** (27)
  I  YES
  I
2 ***** (118)
  I  NO
  I
  I.....I.....I.....I.....I.....I
  0          40          80          120          160          200
FREQUENCY
  
```

MEAN 1.814 MEDIAN 1.886 MODE 2.000

VALID CASES 145 MISSING CASES 0

QUEST 23 ATTENDED FUELS TECHNICAL TRAINING COURSE

CODE

```

I
1 ***** (130)
  I  YES
  I
2 ***** (15)
  I  NO
  I
  I.....I.....I.....I.....I.....I
  0          40          80          120          160          200
FREQUENCY
  
```

MEAN 1.103 MEDIAN 1.058 MODE 1.000

VALID CASES 145 MISSING VALUES 0

QUEST 24 ATTENDED SUPPLY OPERATIONS OFFICER COURSE

CODE

```

I
1 ***** (80)
  I  YES
  I
2 ***** (65)
  I  NO
  I
  I.....I.....I.....I.....I.....I
  0          20          40          60          80          100
FREQUENCY
  
```

MEAN 1.448 MEDIAN 1.406 MODE 1.000

VALID CASES 145 MISSING CASES 0

QUEST 25 HAVE YOU WORKED IN ANY OTHER PART OF SUPPLY?

CODE

```

I
1 ***** (64)
I NO
I
2 ***** (81)
I YES
I
I.....I.....I.....I.....I.....I
0          20          40          60          80          100

```

FREQUENCY

MEAN 1.559 MEDIAN 1.605 MODE 2.000

VALID CASES 145 MISSING VALUES 0

QUEST 25 BRANCHES WORKED IN SUPPLY

CODE

```

I
1 ***** (27)
I MANAGEMENT AND PROCEDURES
I
2 ***** (40)
I CUSTOMER SUPPORT
I
3 ***** (37)
I MATERIEL SUPPORT
I
4 ** (1)
I SYSTEMS
I
5 ***** (20)
I STORAGE AND DISTRIBUTION
I
6 ***** (19)
I OTHER
I
I.....I.....I.....I.....I.....I
0          10          20          30          40          50

```

FREQUENCY

MEAN 3.028 MEDIAN 2.635 MODE 2.000

VALID CASES 144 MISSING CASES 0

QUEST 26 CURRENT ASSIGNMENT AND NUMBER OF FUELS PERSONNEL  
ASSIGNED

CODE

```

I
1 ***** (37)
I  SUPPLY POSITION
I
2 ***** (43)
I  FUELS STAFF POSITION
I
3 **** (3)
I  LESS THAN 30
I
4 ***** (5)
I  30 OR MORE BUT LESS THAN 50
I
5 ***** (11)
I  50 OR MORE BUT LESS THAN 70
I
6 ***** (46)
I  70 OR MORE
I
I.....I.....I.....I.....I.....I.....I
0          10          20          30          40          50
FREQUENCY

```

MEAN 3.372 MEDIAN 2.349 MODE 6.000

VALID CASES 145 MISSING CASES 0

## Appendix D: Hypothesis Tests and Results of the Sign Tests

Technical. The first section of the survey was used to determine if the fuels officer position warrants a separate AFSC, and the effect of a unique fuels officer AFSC on the efficiency of the fuels organization.

### Question 1:

Ho: Fuels operations have not decreased in efficiency because of the consolidation of the fuels officer and supply officer AFSC.

Ha: Fuels operations have become less efficient by consolidating the fuels officer and supply officer AFSC.

Results: 143 responses  
Agree 96  
Disagree 28  
Neither Agree nor Disagree 19  
 $z = 6.017$  two-tailed  $p = .000$

Decision: Reject Ho.

### Question 2:

1Ho: The consolidation of the fuels officer AFSC with the supply officer AFSC has had no effect on the rate of safety incidents.

1Ha: The consolidation of the fuels officer AFSC and the supply officer AFSC has resulted in increased fuels safety incidents.

Results: 145 responses  
Agree 76  
Disagree 42  
Neither Agree nor Disagree 27  
 $z = 3.038$  two-tailed  $p = .002$

Decision: Reject Ho.

2Ho: The consolidation of the fuels officer AFSC with the supply officer AFSC has had no effect on the fuel servicing rate.

2Ha: The consolidation of the fuels officer AFSC and the supply officer AFSC has resulted in lower fuels servicing rates.

Results: 142 responses  
Agree 20  
Disagree 76  
Neither Agree nor Disagree 46  
 $z = 5.613$  two-tailed  $p = .000$

Decision: Because more than 20% neither agreed nor disagreed, no conclusions can be made.

3Ho: The consolidation of the fuels officer AFSC with the supply officer AFSC has had no effect on accounting errors.

3Ha: The consolidation of the fuels officer AFSC with the supply officer AFSC has increased accounting errors.

Results: 145 responses  
Agree 73  
Disagree 41  
Neither Agree nor Disagree 31  
 $z = 2.903$  two-tailed  $p = .004$

Decision: Because more than 20% neither agree nor disagree, no conclusions can be made.

4Ho: The consolidation of the fuels officer AFSC with the supply officer AFSC has resulted in a stronger fuels quality control program.

4Ha: The consolidation of the fuels officer AFSC with the supply officer AFSC has resulted in a weaker fuels quality control program.

Results: 145 responses  
Agree 17  
Disagree 106  
Neither Agree nor Disagree 22  
 $z = 7.935$  two-tailed  $p = .000$

Decision: Reject Ho.

Question 3:

Ho: Fuels officers believe the fuels operations are not effected by an experienced fuels officer with a unique AFSC.

Ha: Fuels officers believe that fuels operations will benefit by having an experienced fuels officer with a unique AFSC.

Results: 142 responses  
Agree 119  
Disagree 15  
Neither Agree nor Disagree 8  
 $z = 8.898$  two-tailed  $p = .000$

Decision: Reject Ho.

Question 4:

1Ho: Fuel safety records will not be affected by an experienced fuels officer with a unique AFSC.

1Ha: Better safety records will result by having an experienced fuels officer with a unique AFSC.

Results: 145 responses  
Agree 114  
Disagree 17  
Neither Agree nor Disagree 14  
 $z = 8.443$  two-tailed  $p = .000$

Decision: Reject Ho.

2Ho: Fuel quality control records will be weaker by having an experienced fuels officer with a unique AFSC.

2Ha: Fuel quality control records will be stronger by having an experienced fuels officer with a unique AFSC.

Results: 144 responses  
Agree 6  
Disagree 121  
Neither Agree nor Disagree 17  
 $z = 10.165$  two-tailed  $p = .000$

Decision: Reject Ho.



3Ho: The fuels servicing rate will be higher if the fuels officer is experienced with a separate AFSC.

3Ha: The fuels servicing rate will be lower if the fuels officer is experienced with a separate AFSC.

Results: 141 responses  
Agree 22  
Disagree 89  
Neither Agree nor Disagree 30  
 $z = 6.264$  two-tailed  $p = .000$

Decision: Because more than 20% neither agree nor disagree, no conclusions can be made.

4Ho: The accuracy of fuels accounting will not be affected by having an experienced fuels officer with a unique AFSC.

4Ha: The fuels accounting will be more accurate by having an experienced fuels officer with a unique AFSC.

Results: 145 responses  
Agree 109  
Disagree 19  
Neither Agree nor Disagree 17  
 $z = 7.867$  two-tailed  $p = .000$

Decision: Reject Ho.

#### Question 5:

Ho: The technical skills required of a fuels officer do not warrant a unique AFSC.

Ha: The technical skills required of a fuels officer justify a unique AFSC.

Results: 145 responses  
Agree 124  
Disagree 20  
Neither Agree nor Disagree 1  
 $z = 8.583$  two-tailed  $p = .000$

Decision: Reject Ho.

Organization. This section was used to determine if a different organizational structure could improve the efficiency of the fuels operation.

Question 6:

Ho: The in-service rate of fixed equipment will not be affected if LFM were part of the fuels branch.

Ha: The in-service rate of fixed equipment will improve if LFM were part of the fuels branch.

Results: 145 responses  
Agree 134  
Disagree 9  
Neither Agree nor Disagree 2  
 $z = 10.369$  two-tailed  $p = .000$

Decision: Reject Ho.

Question 7:

Ho: Occurance of safety violations due to maintenance will not be affected if LFM were part of the fuels organization.

Ha: Fewer safety violations will occur due to maintenance if LFM were part of the fuels organization.

Results: 145 responses  
Agree 122  
Disagree 11  
Neither Agree nor Disagree 12  
 $z = 9.538$  two-tailed  $p = .000$

Decision: Reject Ho.

Question 8:

Ho: Cryogenic service will not be affected if specialists were assigned to the fuels branch to maintain the cryogenic equipment.

Ha: Increased cryogenic service could be provided if experts were assigned to the fuels branch to maintain the cryogenic equipment.

Results: 145 responses  
Agree 130  
Disagree 7  
Neither Agree nor Disagree 8  
 $z = 10.423$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

Question 9:

1 $H_0$ : Communication with the Deputy Commander for Resource Management (DCR, RM) would improve if base fuels became an independent organization.

1 $H_a$ : Communication with the Deputy Commander for Resource Management (DCR, RM) would improve if base fuels became an independent organization.

Results: 145 responses  
Agree 122  
Disagree 13  
Neither Agree nor Disagree 10  
 $z = 9.295$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

2 $H_0$ : Communication with the Deputy Commander for Maintenance (DCM) would not be affected if base fuels became an independent organization.

2 $H_a$ : Communication with the Deputy Commander for Maintenance (DCM) would improve if base fuels became an independent organization.

Results: 144 responses  
Agree 118  
Disagree 14  
Neither Agree nor Disagree 12  
 $z = 8.965$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

3 $H_0$ : Communication with the Wing Commander would not be affected if base fuels became an independent organization.

3 $H_a$ : Communication with the Wing Commander would improve if base fuels became an independent organization.

Results: 144 responses  
Agree 117  
Disagree 16  
Neither Agree nor Disagree 11  
 $z = 8.671$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

Question 10: If the fuels organization became a separate organization but did not add Refueling Maintenance, LFM, or Cryogenics personnel to the fuels organization:

1 $H_0$ : There would be no difference in service provided by Refueling Maintenance.

1 $H_a$ : Service provided by Refueling Maintenance would improve.

Results: 145 responses  
Agree 94  
Disagree 38  
Neither Agree nor Disagree 13  
 $z = 4.787$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

2 $H_0$ : There would be no difference in service provided by Liquid Fuels Maintenance.

2 $H_a$ : Service provided by Liquid Fuels Maintenance would improve.

Results: 145 responses  
Agree 87  
Disagree 40  
Neither Agree nor Disagree 18  
 $z = 4.082$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

3 $H_0$ : There would be no difference in service provided by Cryogenics.

3 $H_a$ : Service provided by Cryogenics personnel would improve.

Results: 145 responses  
Agree 82  
Disagree 43  
Neither Agree nor Disagree 20  
 $z = 3.399$  two-tailed  $p = .001$

Decision: Reject Ho.

Question 11:

Ho: Fuels officers do not care whether or not fuels is a separate organization.

Ha: Fuels officers would like fuels to be a separate organization.

Results: 142 responses  
Agree 110  
Disagree 25  
Neither Agree nor Disagree 7  
 $z = 7.230$  two-tailed  $p = .000$

Decision: Reject Ho.

Question 12:

1Ho: If fuels officers had their choice, they would leave fuels subordinate to the Chief of Supply.

1Ha: If fuels officers had their choice, they would not leave fuels subordinate to the Chief of Supply.

Results: 138 responses  
Agree 29  
Disagree 88  
Neither Agree nor Disagree 21  
 $z = 5.151$  two-tailed  $p = .000$

Decision: Reject Ho.

2Ho: If fuels officers had their choice, they would not make the fuels branch subordinate to the Deputy Commander for Resource Management.

2Ha: If fuels officers had their choice, they would make the fuels branch subordinate to the Deputy Commander for Resource Management.

Results: 142 responses  
Agree 99  
Disagree 34  
Neither Agree nor Disagree 9  
 $z = 5.550$  two-tailed  $p = .000$

Decision: Reject Ho.

3Ho: If fuels officers had their choice, they are undecided whether or not the fuels branch should be subordinate to the Deputy Commander for Maintenance.

3Ha: If fuels officers had their choice, they would make the fuels branch subordinate to the Deputy Commander for Maintenance.

Results: 139 responses  
Agree 52  
Disagree 76  
Neither Agree nor Disagree 11  
 $z = 2.033$  two-tailed  $p = .042$

Decision: Do not reject Ho.

Career Progression. This section was used to determine if the fuels officer's promotion opportunity and career have been enhanced by having a supply officer AFSC.

Question 13:

Ho: The fuels officer believes that his/her career progression has not been affected by the consolidation with the supply AFSC.

Ha: The fuels officer believes that his/her career progression has been enhanced by the consolidation with the supply AFSC.

Results: 145 responses  
Agree 44  
Disagree 60  
Neither Agree nor Disagree 41  
 $z = 1.471$  two-tailed  $p = .141$

Decision: Because more than 20% neither agree nor disagree, no conclusions can be made.

Question 14:

Ho: The fuels officer did not want to be assigned to a fuels position prior to the current assignment.

Ha: The fuels officer did want to be assigned to a fuels position prior to the current assignment.

Results: 140 responses  
Agree 94  
Disagree 26  
Neither Agree nor Disagree 20  
 $z = 6.116$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

Question 15:

1 $H_0$ : Having fuels officer experience has had no effect on the supply officer career progression.

1Ha: Having fuels officer experience has benefitted the supply officer career progression.

Results: 144 responses  
Agree 108  
Disagree 17  
Neither Agree nor Disagree 19  
 $z = 8.050$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

2 $H_0$ : Having fuels officer experience has had no effect on supply officer's total military experience.

2Ha: Having fuels officer experience has benefitted the supply officer's total military experience.

Results: 145 responses  
Agree 131  
Disagree 9  
Neither Agree nor Disagree 5  
 $z = 10.226$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .

Question 16:

$H_0$ : If the fuels branch were taken out of supply and made a separate organization, the fuels officer would not stay in the fuels career field.

Ha: If the fuels branch were taken out of supply and made a separate organization, the fuels officer would stay in the fuels career field.

Results: 145 responses  
Agree 112  
Disagree 20  
Neither Agree nor Disagree 13  
 $z = 7.921$  two-tailed  $p = .000$

Decision: Reject  $H_0$ .



## Appendix E: Kruskal-Wallis Tests

The Chi-Square and significance figures are corrected for ties for each test.

Rank. First and second lieutenants were combined for group one and lieutenant colonels and colonels were combined to make up group four in order to have sufficient numbers to run the test.

Ho: All ranks answered each question the same way.

Ha: At least one rank of respondents answered the question differently than the others.

### Results:

Question 5: Chi-square = 1.126 Significance = .771  
Decision: Fail to reject Ho.

Question 11: Chi-square = 6.177 Significance = .103  
Decision: Fail to reject Ho.

Question 13: Chi-square = 11.483 Significance = .009  
Decision: Reject Ho.

Question 13 comparing lts, capts, majs:  
Chi-square = 1.921 Significance = .383  
Decision: Fail to reject Ho.

Question 15A: Chi-square = 4.325 Significance = .228  
Decision: Fail to reject Ho.

Question 15B: Chi-square = 5.143 Significance = .163  
Decision: Fail to reject Ho.

Question 16: Chi-square = 6.086 Significance = .108  
Decision: Fail to reject Ho.

Fuels Experience. Those supply officers with over four years of fuels experience are compared with those with less than four years of fuels experience.

Ho: Supply officers with less than four years of fuels experience responded the same way as those with more than four years of fuels experience.

Ha: Supply officers with less than four years of fuels experience responded differently than those with more than four years of fuels experience.

Results:

Question 5: Chi-square = .382 Significance = .537  
Decision: Fail to reject Ho.

Question 11: Chi-square = .642 Significance = .423  
Decision: Fail to reject Ho.

Question 13: Chi-square = 12.241 Significance = .000  
Decision: Reject Ho.

Question 15A: Chi-square = .504 Significance = .478  
Decision: Fail to reject Ho.

Question 15B: Chi-square = 2.117 Significance = .146  
Decision: Fail to reject Ho.

Question 16: Chi-square = .506 Significance = .477  
Decision: Fail to reject Ho.

Supply Experience. This test compared those respondents who had no supply experience but fuels and those who had other supply experience.

Ho: Supply officers with only fuels experience responded the same as those who had other supply experience.

Ha: Supply officers with only fuels experience responded differently than those who had other supply experience.

Results:

Question 5: Chi-square = 5.454 Significance = .020  
Decision: Reject Ho.

Question 11: Chi-square = .283 Significance = .595  
Decision: Fail to reject Ho.

Question 13: Chi-square = 25.124 Significance = .000  
Decision: Reject Ho.

Question 15A: Chi-square = .017 Significance = .896  
Decision: Fail to reject Ho.

Question 15B: Chi-square = .186 Significance = .666  
Decision; Fail to reject Ho.

Question 16: Chi-square = 6.547 Significance = .011  
Decision: Reject Ho.

Current Assignment. The groups compared were those in a supply position, those in a fuels staff position, and those currently serving as base fuels officers regardless of the number of fuels personnel assigned.

Ho: Supply officers in a supply position, fuels staff position, and base fuels position responded the same way.

Ha: At least one group of supply officers in a supply position, fuels staff position, and base fuels position responded differently.

Results:

Question 5: Chi-square = 4.703 Significance = .319  
Decision: Fail to reject Ho.

Question 11: Chi-square = 5.796 Significance = .215  
Decision: Fail to reject Ho.

Question 13: Chi-square = 15.474 Significance = .004  
Decision: Reject Ho.

Question 13 testing the last three groups (those with fuels personnel assigned)

Chi-square = .123 Significance = .940  
Decision: Fail to reject Ho.

Question 15A: Chi-square = 11.170 Significance = .025  
Decision: Fail to reject Ho.

Question 15B: Chi-square = 8.078 Significance = .089  
Decision: Fail to reject Ho.

Question 16: Chi-square = 8.629 Significance = .071  
Decision: Fail to reject Ho.

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## VITA

Captain Leon C. Spackman was born on 11 June 1954 in Chicago, Illinois. He graduated from high school in Smithfield, Utah, in 1972 and attended Utah State University, graduating in 1978 with a Bachelor of Arts degree in Music. Upon graduation, he received a commission in the USAF through the ROTC program. He entered active duty in October 1978 and completed navigator training in May 1979. He then attended electronic warfare school at Mather AFB, CA, graduating in November 1979. He was then assigned as a B-52H electronic warfare officer at K.I. Sawyer AFB, MI. After 18 months of flying duty, he was medically grounded and assigned as the fuels officer at K.I. Sawyer AFB, until entering the School of Systems and Logistics, Air Force Institute of Technology, in June 1984.

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Title: <b>FUELS BRANCH REORGANIZATION: A STUDY OF THE FUELS OFFICER AND THE FUELS ORGANIZATION</b>				
Thesis Advisor: <b>Richard D. Mabe, Capt, USAF Instructor of Supply Management</b>				
<div style="text-align: right;">Approved for public release; LAW AFR 100-14 <b>LYN E. WOLAVER</b> 11 Jan 85 Dean for Research and Professional Development Air Force Institute of Technology (AFIT) Wright-Patterson AFB OH 45433</div>				
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→ This study attempted to determine the effect of consolidating the fuels officer and supply officer AFSCs. Further, it tested the possible effects of changing the existing organization to give the base fuels officer more control over factors that currently fall outside of his/her jurisdiction.

To gather information, a written survey was sent to Air Force supply officers who were either serving in fuels positions or who had at least one year of fuels experience. The data was analyzed using two nonparametric tests, the Sign Test and the Kruskal-Wallis Test. The results of these tests indicated that fuels operations have become less efficient since the AFSC consolidation, and the technical skills required of fuels officers warrant a unique AFSC. The results also indicated the fuels operation could become more efficient if first, supporting agencies were assigned to the fuels organization and second, fuels were removed from the Supply Squadron and designated as a separate organization.

Recommendations: *Reorganize organization* →



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